Pure Appl. Biol.,13(3):261-274, September, 2024
http://dx.doi.org/10.19045/bspab.2024.130025

Research Article

Comparative study on total ear canal ablation and lateral bulla osteotomy in dog

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Citation
Love Son Lakhani, Ahmed Nawaz Tunio, Pershotam Khatri, Abdul Salam Khoso, Muhammad Aqeel, Mukesh Kumar Menghwar, Saeed Ahmed Vighio and Hargun Das Malhi. Comparative study on total ear canal ablation and lateral bulla osteotomy in dog. Pure and Applied Biology. Vol. 13, Issue 3, pp261-274.
http://dx.doi.org/10.19045/bspab.2024.130025

Received: 15/11/2023 Revised: 12/01/2024 Accepted: 15/01/2024 Online First: 16/01/2024

Abstract

Both otitis externa and otitis interna are creating major health issues in dogs, especially in pet dogs. Hence, it is now assured that if such animals are not managed surgically, they may lead to death. Therefore, to save the lives of affected animals they are required to be treated by TECA and LBO procedures to resolve ear disease that's why this research was conducted on eight male dogs, and they were randomly divided into two groups, respectively A & B by placing four male dogs in each group. In group A, Total Ear Canal Ablation (TECA) and in group B, Lateral Bulla Osteotomy (LBO) procedures were performed. A (T-shape) incision was made using all aseptic precautions. The physiological parameters of group A, TECA, and group B, LBO, especially rectal temperature, heart rate, and respiratory rate were noted. The results of this experiment showed that two different surgical procedures were performed on each dog's ear to find out the best procedure for the treatment of otitis in dogs. In group A, the procedure TECA was performed on four dogs, and the results showed that 4 out of 4 male dogs were found best after surgery and no significant complications were observed. Whereas, the duration of surgery was less in group A (67.25 min), and a longer duration was recorded in group B (88.25 min). The numerical rating scale (0-3) was used for the assessment of clinical parameters. The postoperative hemorrhage, abscess, incisional drainage, vestibular signs, and pina necrosis complications were recorded as minimum in group A TECA and maximum in group B LBO. There was no facial nerve paralysis complication recorded in group A TECA, but a temporary complication was present in one dog of group B LBO. Significantly maximum skin wound healing days were recorded in group B LBO, and achieved on day 18, while the minimum skin wound healing days were recorded in group A TECA, and achieved on day 14. The significantly maximum post-operative swelling score was recorded in group B LBO (107.25 mm) after 12 hours of surgery, while the minimum post-operative swelling score was recorded in dogs of group A TECA (18.75 mm) after 48 hours of surgery, and significantly varied with each other in different time intervals. Significantly higher Hemoglobin, RBCs, and Platelets were recorded in Group A (12.22 Hb g/dl), (5.60 m/mm3), (524 P/mcl) and WBCs were higher in Group B (22 thousand/mm3) after four days of surgery. It is concluded that total ear canal ablation is an effective surgical technique for the solution of otitis interna (internal ear swelling), otitis media (internal ear swelling), and otitis externa (external ear swelling) in dogs. TECA procedure is inexpensive it can be performed smoothly and its beneficial and economical to the scientific community.

Keywords: Complications; Dog; LBO; Otitis Externa; Pakistan; TECA

Introduction

Otitis externa is a disease of the ear canal and its surrounding tissues, whether they are horizontal or vertical [1]. Otitis externa is a disease that is common in dogs. It is a multi-factorial skin disease with an occurrence of 20%. Primary otitis media in dogs is quite uncommon disease [2]. Otitis media denotes the inflammation of the inner ear canal which is frequently associated with otitis externa [3]. Moreover, otitis interna is an inner ear canal infection that typically results from otitis media [4]. The pinna and tympanic membrane of the external ear canal are all susceptible to this disease [2]. Early investigations found that persistent deep wound impurity, abscess, and debilitating fistula development occurred in up to 11% of dogs with an overall complication rate of 82% [5].

However, the most common reason for deliberation observed at small animal clinics is otitis disease. The study of ear illness is a component of the dermatology specialty, since it is typically recognized as a symptom of an underlying condition. It is critical to determine the extent of the inflammation, and it's not easy to define it as otitis externa, media, and interna but based on history and clinical indications it can be observed [2]. There are three anatomical divisions which are described here. The external ear diverges in different sizes and shapes giving to the different kinds of breeds of the dog. The external ear is composed of the pinna and external auditory meatus. The middle ear is mainly composed of a tympanic cavity, which is connected to the pharynx with a Eustachian tube. The bony labyrinth is the part of the inner ear which is used for hearing and balance. The external ear and middle ear are divided by the tympanic membrane. Whereas, the auditory meatus marks the entry of the horizontal canal into the middle ear. The inner ear and tympanic membrane are combined with auditory ossicles [2, 5]. In dogs, auricular cartilage is responsible for the appearance of the canine pinna. The auricular cartilage is elastic and thin from the apex and it coils into a semi-tube's base. The pinna is covered on both sides by skin that is tightly bound to the perichondrium of the auricular cartilage. The pinna's crucial role is to effectively emphasize and catch sound. The medial and lateral segments of the helix, frequently called the auricular cartilage's edge, converge near the apex of the ear [5]. Total ear canal ablation (TECA) is conducted without regularly obtaining considerable tympanic bulla disclosure, curettage, or removal of the tympanic cavity since early reports of surgical therapy for end-stage ear canal illness describe a very high complication rate. Even chronic deep-seated contamination with ear entire canal epithelial cells such as hyperplasia, stenosis, and calcification are the most common end-stage ear conditions which are seen by practitioners [6]. Total ear canal ablation (TECA) is a procedure for long-stage ear disease in which the complete removal of the horizontal ear canal, vertical ear canal, whole external ear canal, smelly debris, abnormal epithelium cells, external auditory meatus, external acoustic meatus, and tympanic cavity. To prevent significant neurovascular structures that cannot be easily identified or exposed during surgery, this salvage approach necessitates time-consuming dissection. However, as otitis media in dogs is frequently accompanied by chronic otitis externa, a lateral bulla osteotomy (LBO) is frequently performed along with (TECA). The same surgical technique may be used to study the tympanic cavity, which is a more efficient method [7]. To ensure complete middle ear evacuation, ear canal ablation with a few mean tympanic cavity exposures, such as lateral bulla osteotomy (LBO) or ventral bulla osteotomy (VBO) is currently performed. For end-stage ear canal disease with concomitant middle ear involvement,

this procedure is regarded as the gold standard treatment. According to **[8]**, significant issues are becoming less common and have little impact on performance over the time.

Consequently, a lot of researchers indicated otitis externa as well as otitis interna, and they reported that both otitis externa and otitis interna are creating major health issues in dogs, especially in pet dogs. Hence, it is now assured that if such animals are not managed surgically, they may lead to death. Therefore, to save the lives of affected animals they are required to treat by TECA and LBO procedures to resolve ear disease. Whereas, the success ratio is up to 93% in dogs **[8, 9]**. After going through several previous studies, we have found better results in TECA. Similarly, we hypothesized that total ear canal ablation is far better than lateral bulla osteotomy in dogs, because of the small incision size and less complication. To justify the differences between TECA and LBO, our study aimed to determine the surgical post-operative complications of TECA and LBO and to evaluate the wound healing of TECA and LBO procedures. Moreover, the degree and form of the chronic ear disease process must be identified, as well as any potential surgical procedure or anesthetic issues, by a thorough post-operative blood parameter check-up. Contamination during surgery is unavoidable in a proliferative ear canal due to the difficulty of aseptically preparing it **[10]**.

Objectives

The objectives of this study were as follows: (1) to evaluate the wound healing of total ear canal ablation and lateral bulla osteotomy in dogs (2) to determine the post-operative complications following total ear canal ablation and lateral bulla osteotomy in dogs

Materials and Methods

Research description

A total no of eight male dogs weighing between 12 to 22 kg and ages ranging from 8 to 11 months were recorded through examination of the front teeth. Surgery was performed in a postgraduate research room at, the Department of Surgery and Obstetrics Sindh Agriculture University Tandojam. This research was started after the dogs were adapted to the environment for a week. All animals were physically checked and then used for the experiment. The animals were kept in an indoor patient ward under a standard animal experimental environment and guidelines of the Animal Care and Use Committee (ACUC). All dogs were fasted for 12 hours and watered for 6 hours before the start of the surgical procedure. The physiological parameters such as rectal temperature (◦F), heart rate (bpm), and respiratory rate (bpm) were recorded before the start of the surgical procedure and then continued every 10 minutes to 24 hours after surgery. Post-surgical complications such as (Postoperative hemorrhage, Facial nerve paralysis, Abscess, Incisional drainage, Vestibular signs, and Pina necrosis) were recorded.

Anesthetic protocol

All dogs were pre-anesthetized with Atropine 0.04mg/kg, Xylazine 0.5mg/kg, and Acepromazine 0.05mg/kg per body weight administered intramuscular (IM). Then dogs were anesthetized with a combination of Ketamine HCL 10 mg/kg, and Diazepam 0.25 mg/kg per body weight using an IV cannula intravenously. Animals were maintained with isoflurane using the anesthetic machine. A local anesthetic of Lidocaine (2%) 4 ml was injected proximal and distal to the ear.

Surgical procedures

In order to do the total ear canal ablation (TECA), the lateral cranial and cervical regions were prepared and dropped in a clean environment. In lateral recumbency, dogs were lying on their sides. The external ear canal opening was created by a T-shaped skin incision across the vertical ear canal using a

scalpel handle with a blade, a diathermy machine, and blunt-sharp dissection. The surrounding soft tissue, skin, and cartilage were easily separated from the vertical ear canal. A pair of scissors was used to cut the cartilaginous ear canal after it had reached the osseous external auditory meatus. A rongeur instrument was used to eradicate the ventral borders of the osseous external auditory meatus approximately 8 mm by 5 mm of the lateral wall of the tympanic bulla. A curved mosquito hemostat was used to remove the tympanic membrane and malleus. With the use of a curette, the bulla's septum was opened. An electric diathermy machine was used to remove the lamina propria, cancerous tissue, and epithelium lining of the osseous external acoustic meatus. The two compartments tympanic cavities underwent curettage and saline irrigation (0.8% saline) procedures. At the edge of the tympanic cavity, a 1-cm Penrose drain was inserted. The 2-0 Vicryl was used to suture the subcutaneous layer. Silk was used to suture the skin. On the third day, the Penrose drain was taken out, and on the fourteenth day, the skin sutures were taken out.

Post-operative care

All dogs were treated with the injection of meloxicam 0.2 mg/kg, penicillin 50000 units/kg, and Pheniramine maleate 0.2 mg/kg per body weight intramuscularly for post-operative care. Antiseptic solution was applied at the site of incision after suturing. To prevent subsequent infections, antibiotics were administered to all the male dogs. Anti-inflammatory and analgesic medicines were administered to decrease inflammation and pain. Non-absorbable suture materials were removed on the 14th day after the wound was healed.

Statistical analysis

The statistical analysis data was subjected to ANOVA to compare the difference between mean values by using Statistical Software Statistic V-8.1 (2023). Descriptive statistics analysis and MS Excel were also used. Using the least significant difference (LSD) technique, the significant value was calculated at $P<0.05$.

Results and Discussion

Physiological parameters

The mean values were significantly different from each other at different time intervals. The maximum rectal temperature was recorded in group A (102°F) at 24th hour after surgery, while the minimum rectal temperature was recorded in group B (96.20°F) at 40th minute of surgery (Table 1). The mean values were significantly different from each other at different time intervals. The maximum heart rate was recorded in group A (130.25 bpm) at 24th hour after surgery, while the minimum heart rate was recorded in group B (89.25 bpm) at 40th minute of surgery (Table 2). The mean values were significantly different from each other at different time intervals. The maximum respiratory rate was recorded in group A (22.75 bpm) at 24th hour after surgery, while the minimum respiratory rate was recorded in group B (11.50 bpm) at 40th minute of surgery (Table 3).

Duration of surgery

The duration of surgery was recorded for both groups (Fig. 1). Moreover, between both groups, the significantly maximum duration of surgery was recorded in group B (88.25 minutes), while the minimum duration of surgery was recorded in group A (67.25 minutes).

Observation of different clinical complications

The mean value for postoperative hemorrhage complication was observed and recorded by a numerical rating scale from 0-3 score; although, it has resulted that dogs of group A (TECA) have fewer post-operative hemorrhage complications as compared to the dogs of group B (LBO) (Table 4). Facial nerve paralysis complication was observed and recorded by a numerical rating scale from

0-3 score. However, it has resulted that dogs of group A (TECA) have no facial nerve paralysis complication as compared to the dogs of group B (LBO) (Table 5). The mean value for abscess complication was observed and recorded by a numerical rating scale from 0-3 score; although, it has resulted that dogs of group A (TECA) have fewer abscess complications as compared to the dogs of group B (LBO) (Table 6). The mean value for incisional drainage complication was observed and recorded by a numerical rating scale from 0-3 score Although, it has resulted that dogs of group A (TECA) have fewer incisional drainage complications as compared to the dogs of group B (LBO) (Table 7). The mean value for vestibular signs complication was observed and recorded by a numerical rating scale from 0-3 score; although, it has resulted that dogs of group A (TECA) have fewer vestibular signs complications as compared to the dogs of group B (LBO) (Table 8). The mean value for pina necrosis complication was observed and recorded by a numerical rating scale from 0-3 score; although, it has resulted that dogs of group A (TECA) have fewer pina necrosis complications as compared to the dogs of group B (LBO) (Table 9).

Observation of clinical parameter (Skin wound healing) in dog

The mean values for clinical parameter (skin wound healing days) were recorded (Fig. 2). Moreover, in both groups, significantly maximum skin wound healing days were recorded in group B (18 days), while the minimum skin wound healing days were recorded in group A (14 days).

Post-operative swelling score

The mean values for the post-operative swelling score were recorded at different time intervals (Fig. 3). Moreover, in both groups, the significantly maximum post-operative swelling score was recorded in group B (107.25 mm) after 12 hours of surgery, while the minimum post-operative swelling score was recorded in group A, (18.75 mm) after 48 hours of surgery. Furthermore, the post-operative swelling score groups A and B were significantly varied with each other at different time intervals.

Post-operative hemato-biochemical evaluation

The mean values of Hemoglobin, RBCs, WBCs, and platelets of dogs kept under groups A and B were recorded after four days of surgery (Fig. 4-7). Moreover, in between both groups significantly maximum Hemoglobin, Red Blood Cell, and Platelets were recorded in Group A (12.22 Hb g/dl), (5.60 m/mm3), (524 P/mcl) and White Blood Cells were maximum in Group B (22 thousand/mm3) after fourth day of surgery, while the minimum Hemoglobin, Red Blood Cell, and Platelets were recorded in group B (11.17 Hb g/dl), (5 m/mm3), (496.75 P/mcl) and WBCs were minimum in Group A (18.75 thousand/mm3) after fourth day of surgery.

The maximum rectal temperature was recorded in group A (102°F) at 24th hour after surgery, while the minimum rectal temperature was recorded in group B (96.20°F) at 40th minute of surgery. However, a similar relationship was observed by **[11, 12]**. Where rectal temperature was significantly decreased during isoflurane anesthesia. The parameters evaluated here demonstrated the intensity of physiologic influence on the patients, and the increase of the isoflurane dose reduces the temperature. It also gives a smooth recovery and better muscle relaxation after any surgical procedure. The maximum heart rate was recorded in group A (130.25 bpm) at 24 th hour after surgery while the minimum heart rate was recorded in group B (89.25 bpm) at 40 th minute of surgery, while other workers have also observed **[12, 13]**. The diazepam and ketamine treatment yielded significantly lower HR than isoflurane and higher levels of HR were observed in isoflurane at 20th

minute. Also, they found that the heart rate and blood pressure were decreased within some ranges and surgical procedures affects the heart rate. The maximum respiratory rate was recorded in group A (22.75 bpm) at 24th hour after surgery while the minimum respiratory rate was recorded in group B (11.50 bpm) at 40th minute of surgery. However, this finding is in agreement with the findings of **[12, 13]**. They observed isoflurane is associated with a significant drop-in respiratory rate. Also, respiratory depression was particularly reflected and lowered at 20th minute followed by a maximum value between 30–60 minutes. They observed surgical stress and complications produced limited side effects on respiratory rate. Results of the current study for post-operative hemorrhage observed which were higher in group B as compared to group A and Similar findings were observed by **[1, 14, 15]** and they described that severe hemorrhage during surgery is rare but has been reported and may result in critical condition of the patient. During ear canal ablation, severe bleeding may take place in the retroarticular vein, external carotid artery, maxillary vein, and internal carotid artery, among other places. However, in our study, one dog experienced severe postoperative bleeding due to a burst retro glenoid vein, which was managed by injecting bone wax into the retro glenoid foramen. Whereas, the mean values for facial nerve paralysis were observed where no facial problem occurs in group A as compared to group B. Similar findings were reported by **[1, 15-18]**. They reported that animals that have facial nerve paralysis likely undergo neuropraxia, which is a transient interruption of nerve function and conduction without associated axonal degeneration. So, this parameter is an intensive and non-specific indicator of pain. There was no association found between the duration of preoperative clinical signs and the incidence of postoperative facial nerve injury following TECA-LBO. The mean values for abscess complication were observed which were maximum in group B as compared to group A. While these observations were supported by similar results **[14, 17-19]**. They noted that owners may have disregarded indicators of infection in some of the reports until over fistulas or abscesses appeared months to years following surgery. It has been hypothesized that collected fluid and debris from the deep areas of the incision may occasionally flow via the auditory canal in certain dogs along with minor intermittent clinical symptoms. The mean values for incisional drainage were observed which were maximum in group B as compared to group A. Similar findings were reported by **[1, 14-16, 20]**. Moreover, they found that painful swelling around the original incision region was common, and incisional drainage was possible. The mean values for vestibular signs were observed which were maximum in group B as compared to group A. Similar findings were reported by **[1, 14, 15, 21]**. Head tilt, nystagmus, and postural abnormalities indicate irritation or damage to the inner ear structures or vestibular portion of the VIII cranial nerve by trauma or infection. The pressure developed in the tympanic cavity through inflammation and hemorrhage after surgery causes inner ear damage. At present the mean values for pina necrosis complication observed were maximum in group B as compared to group A. Similar observations were reported by **[1, 5, 19]**. In addition, it's the best to prevent injury to the major auricular vasculature branches that run medial to the ear canal since doing so increases the risk of developing vascular necrosis of the pinna, which can impair the pina's ability to erect properly. Meanwhile, this study shows that the mean values for skin wound healing days were maximum in group B as compared to group A. However, a similar finding reported by **[1,**

19, 22] observed that the frequency of wound complications such as healing of skin wounds is associated with infection if it is high, then it is comparable with those after TECA and LBO. In TECA the healing days were 14 to 16 days. Whereas, the mean values for a post-operative swelling score were observed which were maximum in group B as compared to group A. Similar results were observed by **[14, 19]**. Meanwhile, swelling processes accounted for 50% of TECA and LBO procedures, and they found that after eight days the swelling was decreased in TECA procedures as compared to LBO procedures. Furthermore, the mean values for Hemoglobin, RBCs, WBCs, and platelets were recorded after surgery. These recommendations were similar to the observation of **[23, 24]** which further reported Hemoglobin and RBCs are important in assessing comparative blood loss during surgery and splenic contraction in blood loss. In Additional, the characteristic stress with absolute white blood cells were found. These findings were similar to the findings of **[21, 25]**.

Table 1: Mean values of rectal temperature recorded in A and B groups of dogs at different time intervals

Time Interval (Mint)	Group A (TECA)	Group B (LBO)
0 (Control)	101.80^{ab}	100.42^{abcd}
10	101.52^{ab}	97.03^{fgh}
20	101.32^{abc}	96.67^{gh}
30	99.72^{abcde}	97.50^{efgh}
40	99.53^{bcde}	96.20^{h}
50	98.63^{defg}	96.75^{gh}
60	99.75^{abcde}	99.17^{cdef}
12 hrs. after surgery	101.58^{ab}	100.10^{abcd}
24 hrs. after surgery	102^{a}	100.57^{abcd}
LSD (0.05)	2.27	
SE±	1.13	

Values with different superscripts significantly varied (P<0.05) (a= Maximum mean, h= minimum mean)

Table 2: Mean values of heart rate recorded in A and B groups of dogs at different time intervals

Time Interval (Mint)	Group A (TECA)	Group B (LBO)
0 (Control)	128.75^{ab}	118.50^{abcd}
10	113.75^{cde}	101.25^{efgh}
20	111.00^{cdef}	98.00^{fgh}
30	105.50^{defg}	91.75^{h}
40	100.00^{fgh}	89.25^{h}
50	96.00^{gh}	92.00^{gh}
60	111.00^{cdef}	100.00^{fgh}
12 hrs. after surgery	124.50^{abc}	116.25^{bcd}
24 hrs. after surgery	130.25^{a}	117.75^{abcd}
LSD (0.05)	13.73	
SE±	6.8	

Values with different superscripts significantly varied (P<0.05) (a= Maximum mean, h= minimum mean)

Table 3: Mean values of respiratory rate recorded in A and B groups of dogs at different time intervals

Time Interval (Mint)	Group A (TECA)	Group B (LBO)
0 (Control)	21.50^{ab}	17.50^{cde}
10	19.25^{bcd}	14.00^{fgh}
20	18.25^{cde}	13.00^{gh}
30	17.00^{de}	12.00^{gh}
40	15.75^{ef}	11.50^{h}
50	14.25^{fg}	12.25^{gh}
60	18.00^{cde}	13.50^{fgh}
12 hrs. after surgery	20.00^{bc}	17.00^{de}
24 hrs. after surgery	22.75^{a}	17.75^{cde}
LSD (0.05)	2.65	
SE±	1.32	

Values with different superscripts significantly varied (P<0.05) (a= Maximum mean, h= minimum mean)

Table 4: Result of postoperative hemorrhage complication in A and B groups of dogs

Complication	GROUP A (TECA)		GROUP B (LBO)	
	Days	Result (MEAN)	Days	Result (MEAN)
Postoperative Haemorrhage	1	1	1	2
	2	0	2	2
	3	0	3	1

Observation= 0=Nill, 1=Mild hemorrhage, 2=Moderate hemorrhage, 3=Severe haemorrhage

Table 5: Result of facial nerve paralysis complication in A and B groups of dogs

Complication	GROUP A (TECA) (MEAN)		GROUP B (LBO) (MEAN)	
	Days	**Result**	**Days**	**Result**
Facial Nerve Paralysis	1	1	1	2
	2	1	2	1
	3	1	3	1

Observation= 1= Absent, 2=Present

Table 6: Result of abscess complication in A and B groups of dogs

Complication	GROUP A (TECA) (MEAN)		GROUP B (LBO) (MEAN)	
	Days	**Result**	**Days**	**Result**
Abscess	4	1	4	3
	8	0	8	2
	12	0	12	1

Observation= 0=Nill, 1=Mild abscess, 2=Moderate abscess, 3=Severe abscess

Table 7: Result of incisional drainage complication in A and B groups of dogs

Complication	GROUP A (TECA) (MEAN)		GROUP B (LBO)(MEAN)	
	Days	Result	Days	Result
Incisional drainage	1	2	1	3
	2	1	2	2
	3	0	3	1

Observation= 0=Nill, 1=Mild Incisional drainage, 2=Moderate Incisional drainage, 3=Severe Incisional drainage

Table 8: Result of vestibular sign complication in A and B groups of dogs

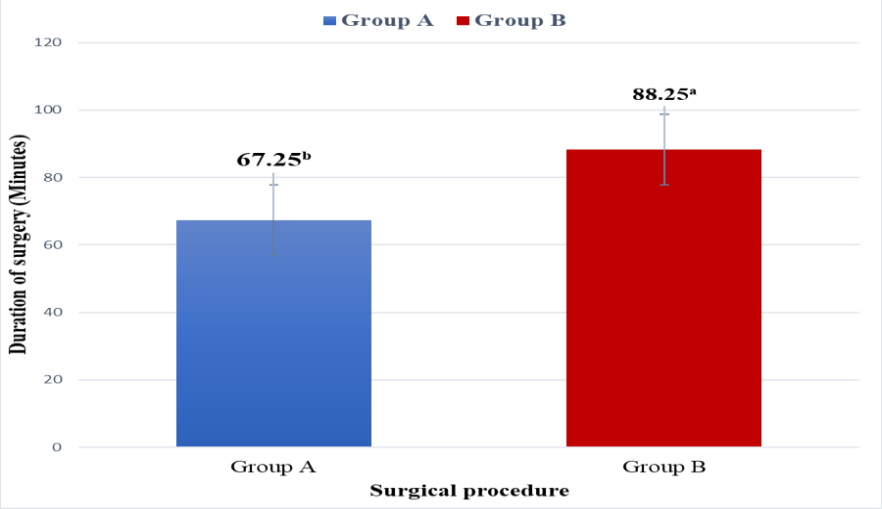
Complication	GROUP A (TECA) (MEAN)		GROUP B (LBO) (MEAN)	
	Days	Result	Days	Result
Vestibular signs	1	1	1	3
	2	0	2	3
	3	0	3	2

Observation= 0=Nill, 1=Mild vestibular signs, 2=Moderate vestibular signs, 3=Severe vestibular signs

Table 9: Result of pina necrosis complication in A and B groups of dogs

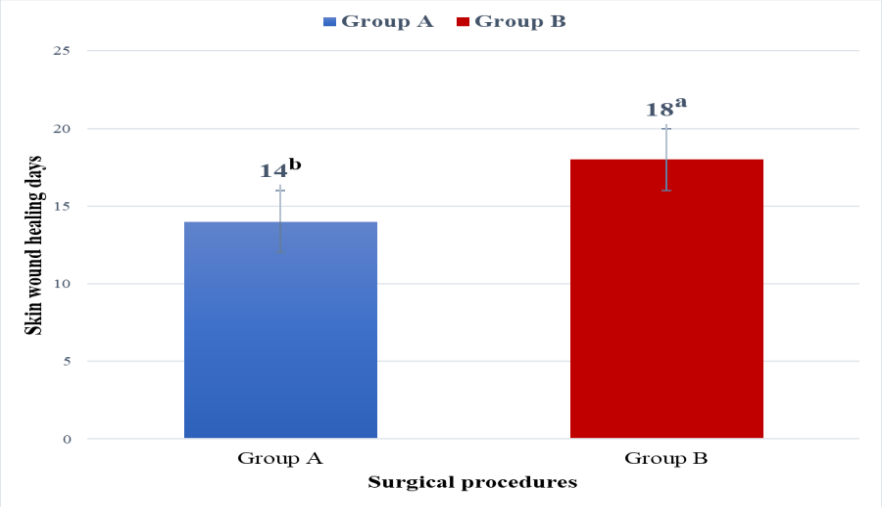
Complication	GROUP A (TECA) (MEAN)		GROUP B (LBO)(MEAN)	
	Days	Result	Days	Result
Pina necrosis	4	0	4	1
	8	0	8	2
	12	0	12	1

Observation= 0=Nill, 1=Mild pina necrosis, 2=Moderate pina necrosis, 3=Severe pina necrosis



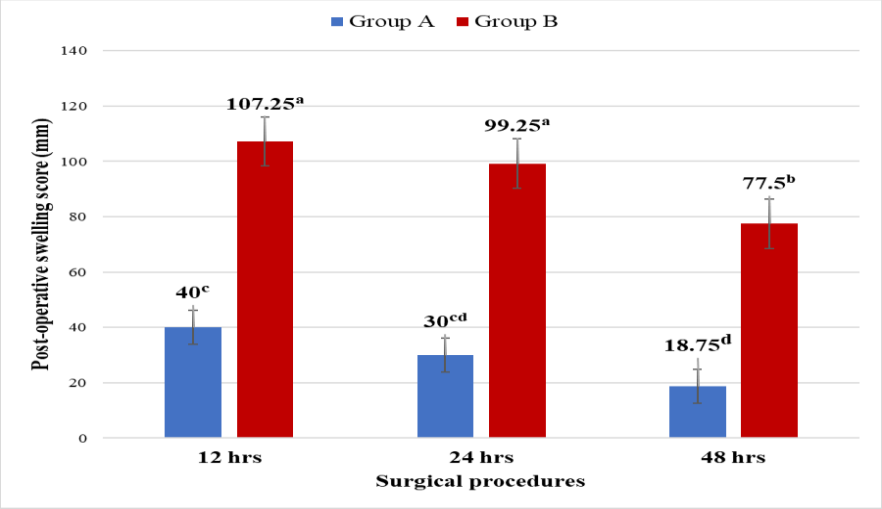
Different letters in the standard error bar diagram (a & b) show statistical difference

Figure 1: The result of the duration of surgery in group (A) TECA and group (B) LBO surgery



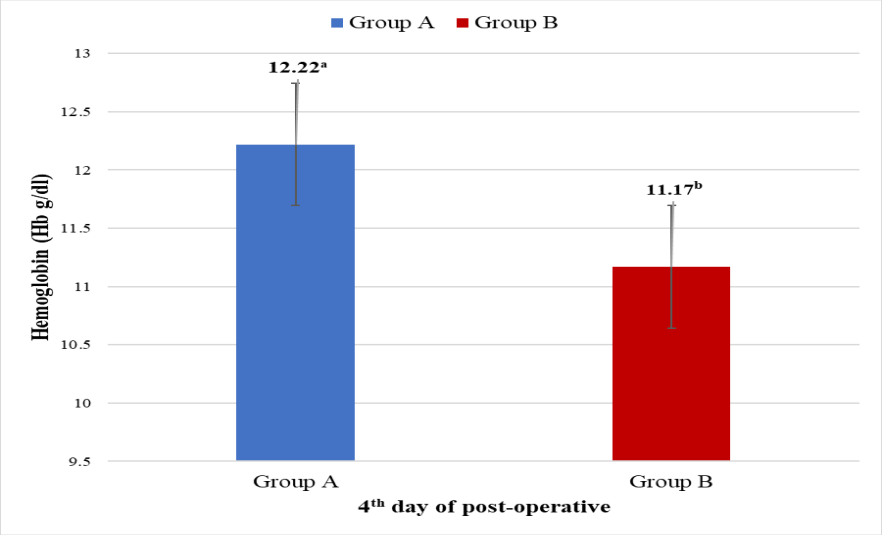
Different letters in the standard error bar diagram (a & b) show statistical difference

Figure 2: The result of the duration of skin wound healing days in group (A) TECA and group (B) LBO surgery



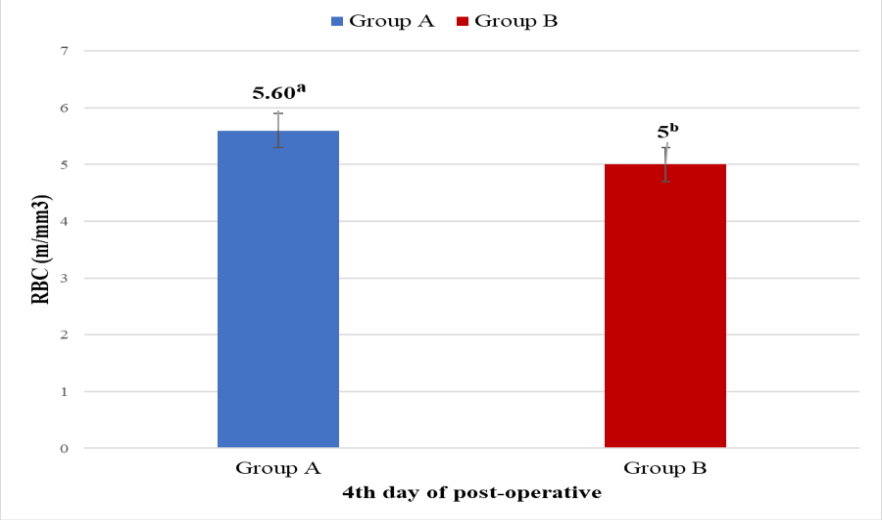
Different letters in the standard error bar diagram (a, b, c & d) show statistical difference

Figure 3: The result of the duration of the post-operative swelling score (mm) in group (A) TECA and group (B) LBO surgery



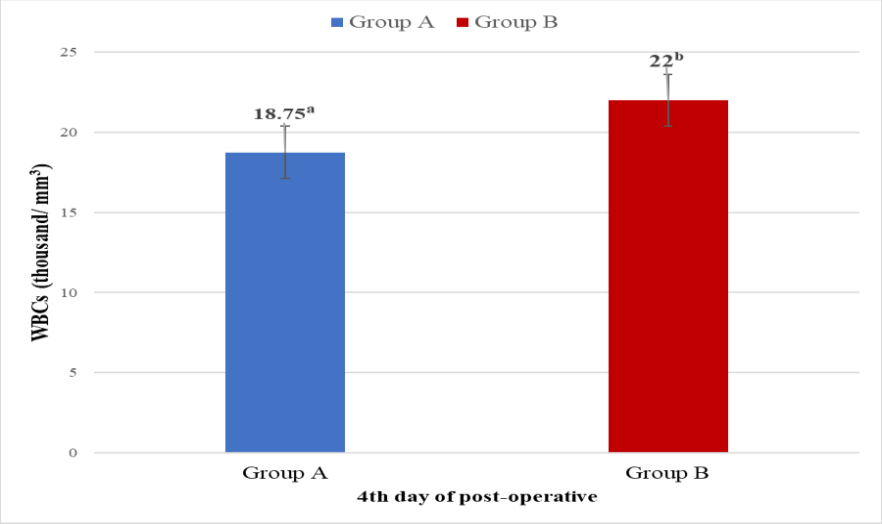
Different letters in the standard error bar diagram (a & b) show statistical difference

Figure 4: The result of hemoglobin (Hb g/dl) on the 4th day of postoperative in group (A) TECA and group (B) LBO surgery



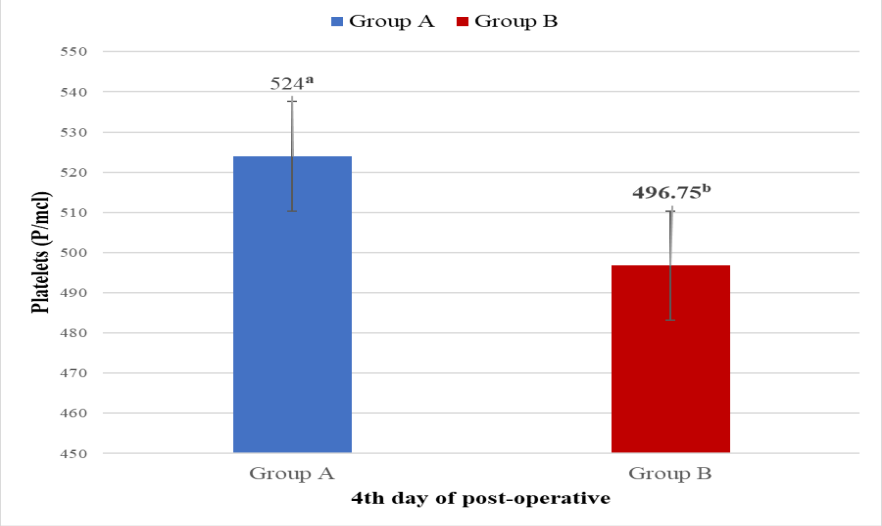
Different letters in the standard error bar diagram (a & b) show statistical difference

Figure 5: The result of RBCs (m/mm^3) on the 4th day of postoperative in the group (A) TECA and group (B) LBO surgery



Different letters in the standard error bar diagram (a & b) show statistical difference

Figure 6: The result of WBCs (thousand/mm^3) on the 4th day of postoperative in group (A) TECA and group (B) LBO surgery



Different letters in the standard error bar diagram (a & b) show statistical difference

Figure 7: The result of Platelets (P/mcl) on the 4th day of postoperative in group (A) TECA and group (B) LBO surgery

Conclusion

In this study, we concluded that LBO is theoretically not an effective procedure for treating chronic otitis media in dogs, because it has higher risk of complications, particularly swelling and abscess, which are strongly linked to failure. Over 50% of patients were included in postoperative problems in LBO followed by postoperative hemorrhage, swelling, facial nerve paralysis, abscess, vestibular signs, and pina necrosis. Therefore, despite the high incidence of complications, most patients had positive outcomes supporting that TECA is still a successful surgical method for treating dogs with chronic otitis externa or otitis media that

are unresponsive to medicinal therapy. Furthermore, it is concluded that the better-quality total ear canal ablation technique achieved a satisfactory technique as compared to Lateral Bulla Osteotomy in dogs. It was found that the total ear canal ablation technique is the best option for otitis interna, otitis media, and otitis externa complications.

Authors' contributions

Conducted the experiments: L Lakhani, conducted making design: AN Tunio, P Khatri & AS Khoso, Collected and analyzed the data: M Akeel, MK Menghwar, SA Vighio & HD Malhi.

Acknowledgment

The current study was conducted under the Department of Surgery and Obstetrics Faculty of Animal Husbandry and Veterinary Sciences at Sindh Agriculture University Tandojam, Pakistan.

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