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تأثير ربط القناة على الغدة اللعابية النكفية

في الكلاب

هارون يوسف، محمود عبدالظاهر، مختار طه، فتحي مكادي، سامية سليم

تم في هذا البحث دراسة أكلينيكية وباثولوجية للتغيرات في الغدة اللعابية

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**EFFECT OF DUCT LIGATION ON THE PAROTID
SALIVARY GLAND OF THE DOG**
(With One Table & 9 Figures)

By
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SUMMARY

The parotid duct was ligated unilaterally in 24 dogs. Clinical findings were noted and macroscopical as well as histopathological results were recorded, 7 to 120 days post-ligation.

Ductligation resulted in retention of secretion, increased intraluminal pressure and dilatation of the duct system leading to involution of the acini. Atrophy of the gland could be obtained by 120 days ligation.

INTRODUCTION

The duct of the parotid salivary gland occasionally suffers rupture and subsequent fistulation secondary to trauma. The history may be iatrogenic following treatment of a critical abscess in the parotid region, ear surgery, or other trauma to the side of the face. Although anastomosis of the duct can be attempted, the procedure is tedious, time consuming, and technically demanding (GOURLEY and VASSEUR, 1985).

Duct ligation was suggested to prevent the outflow of saliva and destruction of the gland function by MORESTIN (1917); O'CONNOR (1958); ABRAMSON (1973); HARVEY (1981) and GOURLEY and VASSEUR (1985).

The available literature lacks any significant informations on the effects of parotid duct ligation in dogs and so an appraisal of the resulting clinical, macroscopic and microscopic findings appeared necessary.

MATERIAL and METHODS

Twenty-four mature mongrel dogs of both sexes were used. The animals were operated on under Thiopental (Specia) general intravenous anaesthesia after premedication with Combelen (Bayer) using a dose of 0.5 mg/Kg. body Wt. intramuscularly.

The parotid duct was ligated unilaterally with silk size 0 through 2.2 cm skin incision. Streptopenicid powder (cid) was applied topically before closure of the incision.

The duration of ligations ranged from 7 to 120 days (Table 1). The clinical observations and post mortum findings were recorded. Specimens from the duct-ligated glands were fixed in 10% neutral buffered formalin. Paraffin embedded sections were stained with Haematoxylin and Eosin (H.E.) stain and examined by light microscopy.

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H. YOUSSEF, *et al.***RESULTS**

The operation site was located where the line drawn at the level of the upper lip meets another line about finger breadth caudal to the lateral canthus of the eye and at right angle to the former line.

At operation; the parotid duct was found to be closely united to the lateral surface of the masseter muscle and undermining of the duct could be obtained after making a parallel longitudinal incision into the superficial fascia covering the masseter muscle, few millimetres from the duct course.

1. Clinical findings: Postoperatively a slight inflammatory swelling of the operation site was noted in 18 animals, while moderate swelling was observed in the other 6 dogs. These swellings subsided within two weeks after the operation.

2. Macroscopically: Neither rupture of the ligated duct nor the formation of a neck cyst was detected in any of the dogs. In comparison to the normal parotid duct (Fig. 1), the size of the ligated ones was markedly increased by the retained salivary secretion. Marked retentive cystic dilatation of the duct was observed at the 30th. day post-ligation (Fig. 2 and Table 1). The imprisoned saliva was mucoid in consistency and greenish yellow in colour. The amount of connective tissue was observed to increase at the expense of glandular tissue 90 days following ligation (Fig.3). Diminution of the glandular tissue with predominance of connective tissue, were most evident 120 days postligation (Fig. 4 and Table 1), while the ducts were not as fully distended as before.

3. Microscopically: The salivary glands examined 7, 15 and 30 days post ligation (Table 1) showed only retention of acidophilic coagulated secretion in the duct lumen. The duct epithelium, acini and interstitium showed no alterations.

Forty-five days after ligation the interlobular and intralobular ducts showed only slight dilatation and accumulation of secretion. The salivary acini were of normal size and shape. In the interstitium early fibroblastic cell proliferation was observed. Congestion and oedema were detected (Fig. 5).

In the salivary glands examined 60, 75 and 90 days post-ligation, most of the ducts were cystically dilated, filled with coagulated secretion and lined by flattened epithelium (Fig. 6). Marked periacinar fibroblastic proliferation was noticeable. The salivary acini appeared collapsed among the proliferating fibroblasts (Fig. 7). Congestion and oedema were also evident.

At 120 days, the same duct changes were found (Table 1). In the interstitium, advanced fibrous connective tissue proliferation was observed. The proliferating connective tissue resulted in gland fibrosis, in addition, atrophy and involution of the salivary acini were observed (Fig. 8). In some lobules, sporadic lymphoid cell infiltration was seen (Fig. 9).

DISCUSSION

Although several methods of treatment have been suggested to prevent the outflow of saliva and stop the function of the salivary gland, many objections against most of them were recorded. While parasympathetic denervation induced marked atrophy of the submandibular and sublingual salivary glands in rats and cats (PERONACE *et al.*, 1964 and HARRISON and GARRETT, 1976), it had little effect on the parotid gland in cats (HARRISON and GARRETT, 1976).

PAROTID DUCT LIGATION

Parotidectomy was introduced by BOJRAB (1981), but the operation was considered by GOURLEY and VASSEUR (1985) to be a difficult procedure because of the gland's position, local anatomy, and surrounding vascular and nervous structures. Radiation therapy not only carries the risk of radiation damage to surrounding structures, but also has unpredictable results (SMITH and GOODE, 1970).

Duct ligation seems to be a good procedure to induce involution of the parotid salivary gland in dogs (Table 1). The absence of postoperative complications such as rupture of the ligated duct or formation of neck cysts are points in favour of the procedure.

While atrophy of the parotid gland of cats occurred within two weeks after duct ligation (HARRISON and GARRETT, 1976), the process took about four months in our dogs. The degree of duct distension, dilatation, fibrosis and accordingly the time for glandular atrophy may vary in different species. In addition, the distance between the gland and the site of ligation may also play a role.

Histopathologically, the cystic dilatation of the interlobular and intralobular ducts, two months after ligation could be correlated with the dilating effect of the imprisoned secretion. This is in agreement with the finding of RUNNELLS *et al.* (1965) and JONES and HUNT (1983).

The fibroblastic stromal proliferation which started as early as 1.5 months post-ligation progressed after 2, 2.5 & 3 months and ended with fibrous connective tissue formation after 4 months. This fibrous connective tissue induced gland fibrosis. While the salivary acini were collapsed after 2 months, atrophy and involution took 4 months to occur. The Lymphoid cell reaction observed 4 months postligation could be considered as a chronic inflammatory response accompanying fibrosis. This is in accordance with HARRISON and GARRETT (1976) and BEDFORD (1980).

It is concluded that duct ligation is an easy, efficient and predictable operation for the destruction of the parotid salivary gland in dogs.

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Table 1: Effects of duct ligation on parotid salivary gland in dogs.

Dog No.	Duration (days)	Macroscopic findings		Microscopic findings		
		Duct (distention)	Gland (atrophy)	Duct (Cystic dilat.)	Fibrosis	Acinar changes (Atrophy)
1	7	+	--	--	--	--
2	7	++	--	--	--	--
3	7	++	--	--	--	--
4	15	+++	--	--	--	--
5	15	++	--	--	--	--
6	15	+++	--	--	--	--
7	30	+++	--	--	--	--
8	30	+++	--	--	--	--
9	30	+++	--	--	--	--
10	45	+++	--	,	;	--
11	45	++	--	,	;	--
12	45	+++	--	,	;	--
13	60	+++	--	,,,	;;	x
14	60	++	--	,,,	;;	x
15	60	+++	*	,,,	;;	x
16	75	++	--	,,,	;;	x
17	75	++	**	,,,	;;	x
18	75	++	*	,,,	;;	x
19	90	++	**	,,,	;;	x
20	90	+	***	,,,	;;	x
21	90	++	**	,,,	;;	x
22	120	+	***	,,,	;;;	xxx
23	120	+	***	,,,	;;;	xxx
24	120	+	***	,,,	;;;	xxx

NB.: a) Duct distension: slight +, Moderate ++ and Marked +++.
 b) Gland atrophy: slight * , Moderate ** and Marked ***.
 c) Cystic dilatation: slight , Moderate ,, and Marked ,,,.
 d) Fibrosis : slight; Moderate ;; and Extensive;;;.
 e) Acinar atrophy : slight x Moderate xx, Marked xxx.
 f) No detectable findings (-).

LEGENDS OF FIGURES

- Fig. (1):** Normal parotid gland (A) and parotid duct (B) of the dog, at operation.
- Fig. (2):** Marked retentive cystic dilatation of the parotid duct at the 30th day post-ligation.
- Fig. (3):** The parotid salivary gland of a dog 90 days after duct ligation. The connective tissue is increasing at the expense of the glandular tissue.
- Fig. (4):** Atrophy of the parotid salivary gland with predominance of connective tissue 120 days post-ligation.
- Fig. (5):** Parotid salivary gland 1.5 month post-ligation showing marked oedema. H.E. x 250.
- Fig. (6):** Parotid salivary gland 2.5 months post-ligation, showing cystically dilated ducts, lined by flattened epithelium with accumulation of secretion H.E. x 160.
- Fig. (7):** Parotid salivary gland 3 months post-ligation showing fibro-blastic proliferation and collapsed acini. H.E. x 250.
- Fig. (8):** Parotid salivary gland 4 months post-ligation showing gland fibrosis and atrophy of the acini. H.E. x 400.
- Fig. (9):** Parotid salivary gland 4 months post-ligation, showing lymphoid cell infiltration. H.E. x 250.

Fig. (1)

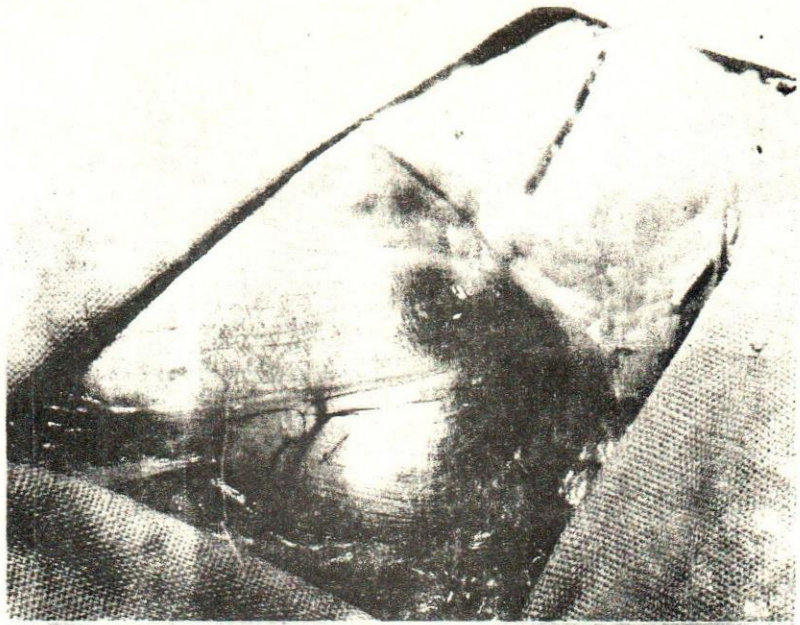


Fig. (2)

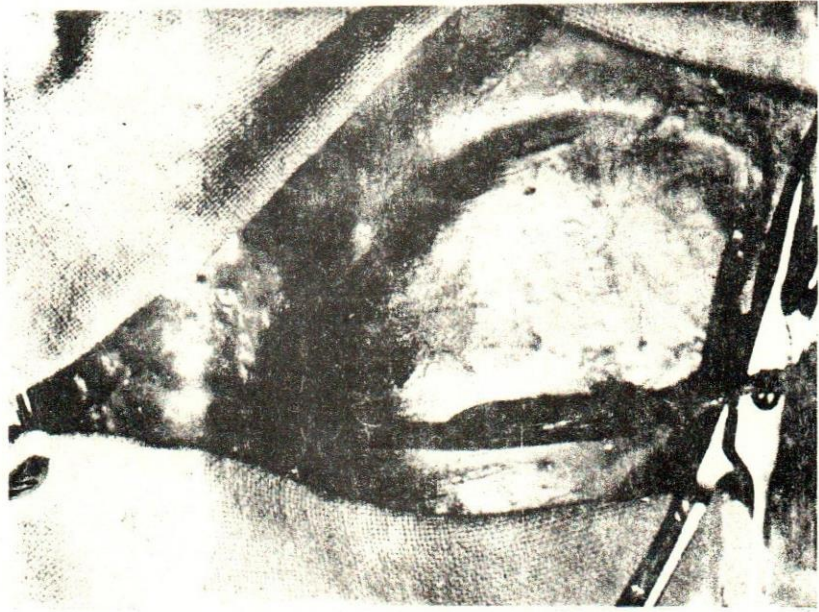
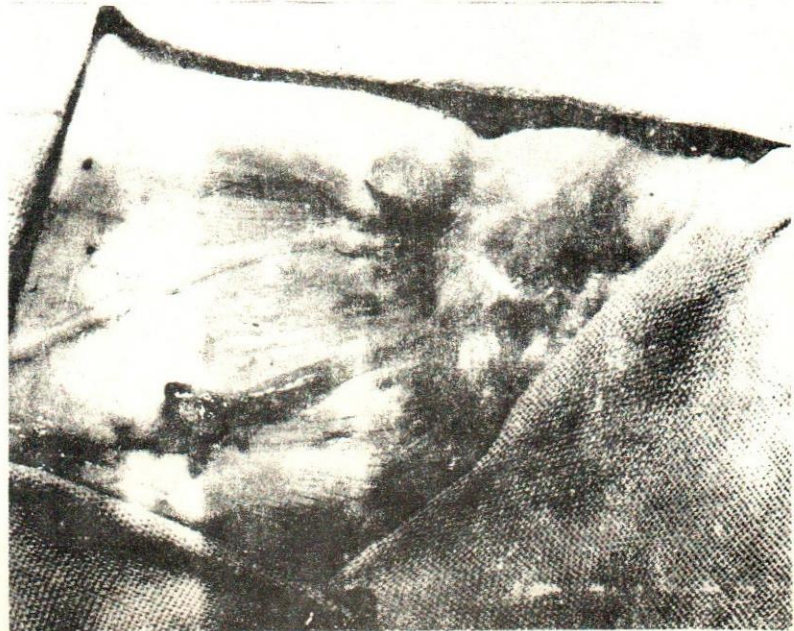


Fig. (3)



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Fig. (4)



Fig. (5)

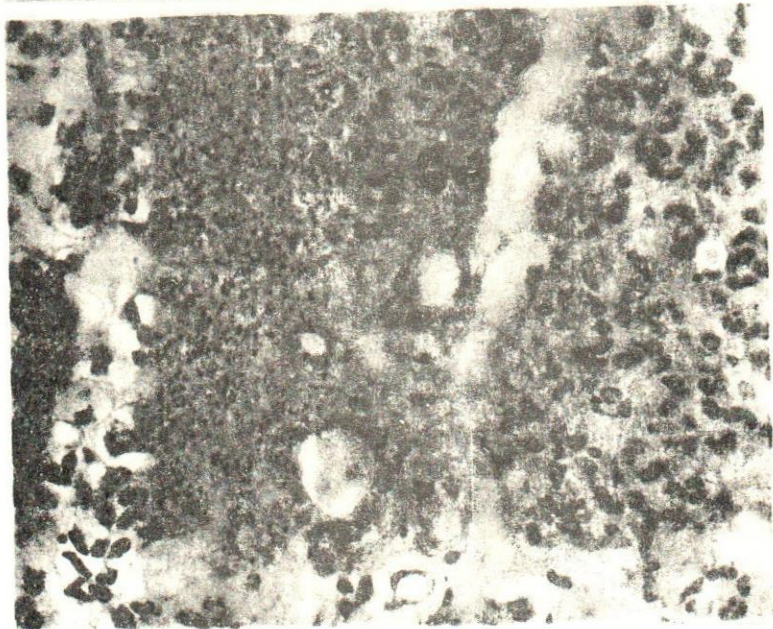


Fig. (6)





Fig. (7)

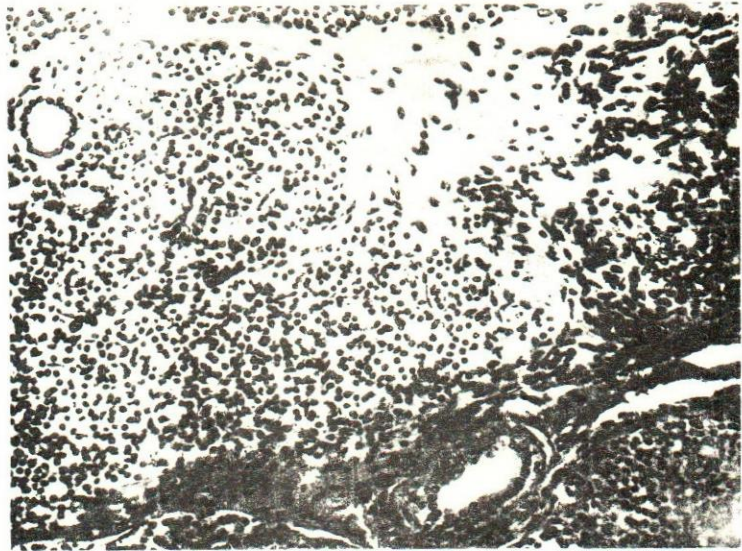


Fig. (8)



Fig. (9)



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