

Dept of Surgery,  
Fac. Vet. Med., Assiut University.

**PAROTID DUCT (STENSON'S DUCT) AFFECTIONS  
IN SOME DOMESTIC ANIMALS**  
(With 2 Tables and 10 Figures)

By

**M.A. SEMIEKA**

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إصابات القناة اللعابية للغدة النكفية في بعض الحيوانات الأليفة

محمد عبدالرحمن سميكية

تم إجراء هذه الدراسة على عدد ١٩ حيوان (١٤ جاموسة ، ٣ حمير ، ماعز وجمال). وكانت هذه الحيوانات تعاني من إصابات في القناة اللعابية للغدة النكفية . تم تشخيص هذه الإصابات بالاعتماد على تاريخ الحالة والملاحظة مع الفحص الإكلينيكي للمنطقة المصابة وكذلك بإجراء أشعة بالصبغة للقناة اللعابية في بعض الحالات المصابة. وتم تسجيل إصابات قناة الغدة النكفية وقد اشتملت هذه الإصابات على ناسور القناة اللعابية ، تمدد القناة اللعابية ووجود حصوات داخل القناة. وتم إجراء العلاج الجراحي المناسب لهذه الحالات حيث كانت نتائج العلاج مرضية.

**SUMMARY**

The present study was carried out on 19 animals (14 buffaloes, 3 donkeys, one goat and one camel). The animals were presented suffering from parotid duct affections. Diagnosis was obtained depending on history of the case, observation and examination of the affected area as well as sialography in some cases. Parotid duct affections recorded in the present study include salivary fistula, ectasia of the duct and sialoliths. Suitable surgical treatment was performed and satisfactory results were obtained.

*Key words: Parotid duct.*

**INTRODUCTION**

Anatomical location of the parotid duct is relatively superficial. It varies among animal species in its course, size and site of entrance to the oral cavity (Dyce *et al.*, 1987).

In buffaloes, parotid duct originates near the apex of the gland and runs rostroventrally, rostrally, then dorsoventrally at the level of the anterior border of the masseter muscle towards the cheek of the animal

(Ahmed, 1988 and Dehghani *et al.*, 1994). In goats the parotid duct originates at the level of mandibular angle and runs rostrally, then dorsorostrally to end at the cheek of the animal. In camels the parotid duct originates from the vertical part of the gland and directed rostrally and then curves dorsally to end at the cheek. However, in donkey it originates from the dorsal part of the gland then passes along the rostral border of the ventral part of the gland between it and the vertical ramus of the mandible. The duct continues its course rostrally and parallel to the horizontal ramus of the mandible then curves dorsally to end at the cheek (Ahmed, 1988).

The parotid duct opens in the buccal cavity just opposite to the upper fifth cheek tooth in bovine (Dehghani *et al.*, 1994 and Tyagi and Singh, 1996), third or fourth maxillary cheek tooth in goats (Tyagi and Singh, 1996) the fourth cheek tooth below the level of the medial canthus of the eye in camel (Tyagi and Singh, 1996) and the third maxillary cheek tooth in equine (Auer and Stick, 1999).

The diameter of the parotid duct is about 3-4 mm in buffaloes, not more than one mm in goat, 4-6 mm in camel and about 2 mm in donkey (Ahmed, 1988).

The common salivary parotid duct affections stated in the available literatures include salivary fistula, sialolithiasis, ectasia and atresia (Jenning, 1984, Dietz & Wiesner, 1984; Misk & Nigam, 1984; Ahmed, 1988; Tyagi & Singh, 1996 and Sadler *et al.*, 1999).

#### MATERIALS and METHODS

Nineteen animals (14 buffaloes, 3 donkeys, one goat and one camel) suffering from parotid duct affections were included in the present study (Table 1).

Table 1: Parotid duct affections recorded in the present study.

Animal	Buffaloes	Goat	Camel	Donkeys	Total
Parotid duct affections					
1) Salivary fistula	9	-	-	-	9
2) Ectasia	4	1	-	-	5
3) Fistula together with ectasia	1	-	-	-	1
4) Sialoliths	-	-	1	3	4
Total	14	1	1	3	19

All animals were females and of different age. They were presented to the Assiut University veterinary teaching hospital or managed during field training in Assiut and Sohag Villages.

Diagnosis of parotid duct affections was based on history of the case, and clinical examination of the affected animals. Sialography using urografin 76% was performed in some cases of parotid duct ectasia to confirm the diagnosis.

Treatment of cases was performed depending on the type of parotid duct affection as following:

- 1) Salivary fistulae were treated with segmental reconstruction of the parotid duct. This technique is based on application of polyethylene tube within the duct through the fistula opening. The tube is fixed within the duct by silk ligation proximal and distal to the level of the fistula (Jennings 1984 and Misk *et al.*, 1991). The affected tissues around the fistula opening were excised followed by trimming and closure of the skin wound using simple interrupted stitches.
- 2) Parotid duct ectasia and ectasia together with salivary fistula in buffaloes were treated by complete reconstruction of the Stenson's duct using polyethylene tube (Misk *et al.*, 1991). Salivary fistula in goat was treated by creation of intraoral fistula. The orifice of the parotid duct is incised with a probe-ended scalpel. The incision was 1-1.5 cm long (Dietz and Wiesner, 1984).
- 3) Cases of sialoliths were treated by surgical removal of the calculi under the effect of tranquilizer and local infiltration analgesia. A skin incision was performed over the swelling along the course of the duct, then the duct was identified and incised along its length, taking care to avoid injuries of the accompanying artery and vein. After removal of calculus, the duct was sutured using 3% catgut and eyeless needle. The skin incision was closed with interrupted silk sutures (Oehme & Prier, 1974 and Misk & Nigam, 1984). The cases were followed up for about 6-12 months post operatively.

## RESULTS

Salivary fistula, ectasia and sialoliths (calculi) were recorded in the present study as disorders in the parotid duct. One case was reported suffering from ectasia together with salivary fistula.

### 1) Salivary fistula (Fig. 1 & 2):

Out of 19 animals, salivary fistula was diagnosed in 9 cases. All animals were female buffaloes and ranged between 5-9-years-old. Case

history indicated that the fistulae were old (9-18 month) and occurred as a result of direct trauma to the duct or due to previous ectasia and misdiagnosed by veterinarians and incised to outside. The fistula openings were located at the level of the parotid duct near the mandibular angle in 7 cases and at the level of cheek in two cases. Examination revealed presence of small opening from which saliva drips. spurts of saliva was more likely to be noted in association with eating. Tissues around the fistula opening underwent fibrous thickening. Severe dermatitis and excoriation of the skin was observed in 5 cases.

Treatment of salivary fistulae by segmental reconstruction of the parotid duct gave good results without any postoperative complications except in one case in which the operation was failed. Follow up of all cases for about 8 months indicated satisfactory results without complications.

## **2) Ectasia of the parotid duct (Figs. 3 - 7):**

Out of 19 animals, ectasia of the parotid duct was reported in 5 cases (4 buffaloes and one goat). All buffaloes were female. The age of the buffaloes was ranged from 7-9 years. The animals were presented suffering from presence of swelling either at the right cheek (in 3 cases) or at the left one (in one case). History of the cases indicates appearance of the swelling from long period may exceed one year. The swelling was observed at the level of parotid duct course. By palpation, the swelling is soft, having the consistency of an engorged vein, cold and painless. By pressure the saliva displaced within the swelling. Sialogram revealed abnormal dilatation of the parotid duct. Examination of oral mucosa showed inflammation around the salivary opening. In buffaloes, complete reconstruction of the affected duct using polyethylene tube gave a good results in all cases without postoperative complications. Follow-up of these cases for 8 months postoperatively showed complete healing.

A 4-year-old female goat was presented with soft fluctuating painless swelling at the right cheek since two years. History of the case indicate enlargement of the swelling during mastication and rumination that decreased in size at other times. Examination revealed large cystic fluctuating swelling at the lower part of the right cheek and at the level of the rostral part of the parotid duct. Manual pressure over the swelling leads to its evacuation, then refilled within 5-10 minutes. The orifice of the parotid duct was easily observed discharging saliva specially during manual pressure on the swelling.

The case was diagnosed as ectasia of the rostral part of the parotid duct. Treatment of this case was performed by creation of intra oral fistula where the external swelling was seen collapsed directly after operation leaving a fold of skin. Follow-up period extended up to two months revealed no recurrency of the swelling.

**3) Fistula together with ectasia of the parotid duct (Fig. 8):**

Out of 19 animals, fistula together with ectasia of parotid duct was diagnosed in one case.

A 6-year-old female buffalo was admitted to the clinic with presence of swelling at the level of the parotid duct of right cheek since 21 month. This swelling has an opening near the angle of the mandible discharging saliva. History of the case indicated appearance of the swelling at first, then the opening occurs several months following the swelling. Observation and examination of the affected area revealed the same symptoms of both ectasia and fistula of the parotid duct which are described above. The case treated by reconstruction of the parotid duct using polyethylene tube where complete healing was obtained. Follow-up period was extend up to 6 months without any recurrences.

**4) Sialoliths or salivary calculi (Figs. 9 & 10):**

Out of 19 animals, sialoliths were recorded in 4 animals (3 donkeys and one camel).

A 5-year-old, 6-year-old and 7 year-old female donkeys were presented with presence of hard swelling at the side of the cheek (right cheek in two cases and left cheek in one case). History of the cases revealed occurrence of the swelling since 3-5 years. Examination revealed presence of cold, painless, hard, movable swelling at the level of the parotid duct. The calculi were removed surgically. They varied in size and shape, yellowish white in color, stony with smooth surface in some areas and rough at other areas. Weight, length and circumference of the calculi were described in Table (2). Surgical removal of calculi was the radical treatment which resulted in complete healing of the all cases without formation of fistulae or other complications during the period of follow-up which exceeds 6 months.

**Table 2:** Showing weight, length and circumference of sialoliths.

Case No	Weight (gm)	Length (cm)	Circumference at its middle (cm)
1	83.62	6.3	11.2
2	134.2	8.3	13.9
3	93.41	6.1	11.8

A 9- year-old female camel was presented suffering from swelling at the side of the cheek near the mandibular angle. History of the case indicated that the swelling was observed since three years. Examination of the affected area revealed presence of cold, painless, hard and movable swelling at the level of the parotid duct near the base of the parotid salivary gland. Surgical removal of the calculus was performed. The calculus was oval in shape with rough surface. The weight, length and circumference of the calculus were 81.2 gm, 5.7 cm and 10.9 cm respectively. Healing was obtained without any postoperative complications.

## DISCUSSION

Bovine produce an enormous volume of saliva (perhaps even more than 100 liters a day) which contributes to the fermentation medium within the fore chambers of the stomach where it helps buffer the fatty acids that are produced. Interference with the normal flow of the saliva to the stomach results in serious depletion of the electrolytes that are normally reabsorbed and recycled (Dyce *et al.*, 1987). Parotid duct problems reported in this study including fistula, ectasia and sialoliths interfere with the flow of saliva and may affect the function of the parotid salivary gland.

Salivary fistula is the most common problem affecting the parotid duct in the present study. It mainly occurs as a result of direct trauma or injury of the superficially situated parotid duct. This result was in agreement with that given by Tyagi & Singh (1996); Auer & Stick (1999) and Sadler *et al.* (1999) in reporting that formation of salivary cutaneous fistulae occur more commonly with direct injury affecting the parotid gland and parotid duct because they are not as protected anatomically as the mandibular and sublingual salivary gland. Several causes were reported resulted in formation of salivary fistulae including formation of abscess at the region of parotid duct (Tyagi and Singh, 1996), and surgical incisions as opening of an abscess or removal of neoplasms (Misk *et al.*, 1991).

Diagnosis of salivary fistula was obtained by clinical symptoms and anatomical location of the fistula opening at the level of the parotid duct. Continuous flow of saliva from the fistula opening was the main symptom and resulted in great losses of salivary secretions.

In the present study, salivary fistula was diagnosed only in buffaloes. This may be due to constant traumatic irritation of the parotid duct by the action of the rough ropes applied around the horns to control

the animal during walking and to tie the animals in the stable. The movement of the buffalo's head during walking in the stable help the rope to come in contact with the parotid duct causing constant trauma and may result in formation of salivary fistula. In most recorded cases, the fistula opening was observed near the angle of the mandible. At this area the duct was superficially located and become more exposed to trauma.

Several methods for treating salivary fistula are available and stated by literatures but segmental reconstruction of the parotid duct using polyethylene tube appears more easier and quicker in application, preserve the function of the parotid gland and gives good results (Misk *et al.*, 1991).

Ectasia of the parotid duct refers to an overall dilatation of the stenson's duct of the parotid salivary gland (Dietz and Wicsner, 1984). The condition is frequent in equines (Dietz and wiesner, 1984) and buffaloes (Misk *et al.*, 1991). In the present study, ectasia was recorded in buffaloes (4 cases) and goat (one case).

Ectasia of the parotid duct occurs mainly as a result of chronic incomplete obstruction of the parotid duct due to inflammation of oral mucosa, chemical injuries and wounds leading to stenosis of the parotid duct orifice. A foreign body may lodge at the papilla leads to obstruction of the duct and accumulation of saliva resulting in ectazia (Dietz and Wicsner, 1984 and Mist *et al.*, 1991).

Presence of fluctuating swelling along the course of the parotid duct indicates its dilatation. Sialography confirms the diagnosis where the sialogram revealed presence of a large swelling at the level of the cheek extending backward to the base of the parotid salivary gland.

In goat parotid duct ectasia was treated by creation of intraoral fistula. The fistula will provide an outlet for continuous flow of saliva which prevent wound closure (Dietz and Wicsner, 1984).

In buffaloes, intraoral fistula can not be used for treatment of parotid duct ectasia. This because the ectazia was present mainly at the caudal half of the parotid duct at the level of the mandible. Treatment was performed by complete replacement of the parotid duct by polyethylene tube which gave good results (Misk *et al.*, 1991).

Sialolithiasis means formation of salivary calculi in the salivary duct. It occurs usually in the Stenson's duct of the parotid salivary gland (Frank, 1961; Oehme & Prier, 1974; O'Connor, 1982; Jennings, 1984 and Auer & Stick, 1999). Frank (1961) stated that sialolith occurs most frequently in bovine but it may also occurs in other species while Oehme





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#### LEGENDS OF FIGURES

- Fig. 1:** Parotid duct fistula near the angle of the left mandible in a buffalo. Note swelling, thickening and excoriation of the tissues around the fistula opening.
- Fig. 2:** Parotid duct fistula near the angle of the right mandible in a buffalo before (A,B) and after (c) operation.
- Fig. 3 & 4:** Parotid duct ectasia in a goat.
- Fig. 5:** Ectasia of the right parotid duct in a buffalo.
- Fig. 6:** Sialogram showing ectasia of the parotid duct at its caudal half close to the parotid salivary gland in a buffalo.
- Fig. 7:** Sialogram showing ectasia of the parotid duct at its rostral part in a buffalo.
- Fig. 8:** Salivary fistula accompanied with parotid duct ectasia in a buffalo.
- Fig. 9:** Sialolith at the stenson's duct of the parotid salivary gland in a donkey.
- Fig. 10:** Sialoliths of different sizes and shapes were extracted from the parotid ducts of three donkeys.







