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A DESCRIPTIVE STUDY OFSIALENDOSCOPYIN THE MANAGEMENT OF CHRONIC OBSTRUCTIVESIALADENITIS

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Type of Study: Original Research

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Abstract:

Background: Diagnostic sialendoscopy is essential to confirm diagnosis of obstruction in the salivary ductal system. Direct visualization of complete ductal system up to terminal branching is possible and any pathology in the ductal lumen can be accurately diagnosed

Objective: To study and improvise the management of chronic obstructive sialadenitis with sialendoscopy.

Methods: 30 patients of age range between 0-70 years of age with salivary gland swelling were studied. These patients after thorough clinical examination and investigations were managed by the sialendoscopy. Sialendoscopy was used both as a diagnostic procedure and for therapeutic intervention when a diagnosis of chronic obstructive sialadenitis was made.

Patients were given appropriate post-operative care and followed up for a period of 6 months. Repeat check sialendoscopy was done for appropriate cases.

Results: The sequelae of sialendoscopy include swelling of the involved gland and pain, which usually subside in one day. There is a low incidence of complications following sialendoscopy. Some patients have persistent swelling of the gland. There is a risk of false passage. The serious complication of duct extirpation is rare but may require emergency gland removal.

Conclusion: In the modern day era of endoscopy, salivary gland excision should no longer be treatment of chronic obstructive sialadenitis. It is only considered when sialendoscopy has failed to offer any benefit and the patient has significant disturbing symptoms due to obstruction.

Keywords: Endoscopy, Parotid Gland, Submandibular Gland, Sublingual Gland, Sialadenitis, Sialendoscopy.

Introduction

In the endoscopy era, newly emerging and interesting study of salivary gland duct diseases by new technique called sialendoscopy.

Salivary glands are classified into two: paired major salivary glands i.e. Parotid gland, Submandibular gland, Sublingual gland with well developed ductal system and multiple minor salivary glands. Ductal system helps in transport of saliva from gland to oral cavity which ultimately helps in mastication.[1] Any stagnation or pathology of ductal system leads to obstructive diseases like stricture, sialolithiasis or mucous plug in duct. Sialendoscopy helps in diagnostic as well as therapeutic tool for management of diseases.

Salivary gland diseases can be classified into benign and malignant conditions. The benign diseases include acute and chronic conditions. Chronic diseases of the salivary gland are classified as obstructive and non-obstructive

diseases. Non obstructive salivary gland disease will require conservative management while obstructive will require definitive management.

Obstructive salivary gland disease is the most common inflammatory disease of major salivary glands. It includes chronic sialadenitis with/without sialolithiasis and strictures.[4]

The commonest site is the submandibular gland where 80-90% of calculi are found, 5- 10% are found in the parotid gland and approximately 5% in the sublingual and other minor salivary glands. Previously chronic sialadenitis of the affected gland were treated as total gland excision which may lead to post operative complications like facial nerve weakness, marginal mandibular nerve dysfunction.[5] Over the period, salvage of the gland was effectively prevented by interventionalsialendoscopy.

Interventional sialendoscopy was successfully helped in gland preservation and prevented post operative salvage therapy complications. Sialendoscopy have been introduced as gold standard diagnostic procedures in case of chronic obstructive sialadenitis and also as therapeutic tool when possible. In this way, it has been possible to offer a valid alternative in place of traditional surgical techniques, with a less invasive and more efficacious approach.[6]

Sialendoscopy can provide direct and more detailed observation of the ductal system compared with sialography. Sialendoscopy is an organ preserving surgical procedure which can achieve satisfactory functional recovery. This is a relatively new approach now emerging as the procedure of choice for obstructive salivary gland disease. It has the advantage of being a non-invasive procedure and patient does not have an external scar.[7]

This study is being conducted to evaluate the effectiveness in preservation of the glands and effective management of chronic obstructivesialadenitis.

Traditionally chronic obstructive salivary gland diseases were investigated by ultrasonography, sialography, computed tomography, if needed magnetic resonance imaging and fine needle aspiration cytology after introduction of sialendoscopy in 1990`s, it was used as diagnostic as well first line of management for chronic obstructive salivary gland diseases. Sialendoscopy is the procedure with minimally invasive technique where direct visualization of the lumen of salivary duct with mini rigid 0 degree telescope to visualize as well to tackle the pathology in the ductal system. So that it will provide direct visualization of duct lumen compared to other diagnostic procedure.[8]

With the invention of the telescopes and popularization of endoscopy as a minimally invasive procedure, the idea of developing a scope small enough for the salivary duct developed into reality.

Katz, in 1991, introduced the mini flexible endoscope into the ductal system of the major salivary glands. He used a 0.8 mm flexible endoscope for the diagnosis and extraction of calculi with Dormia basket in a blind technique.[5] in 1994, Nahlieli described the use of a mini rigid endoscope for diagnosis and treatment of salivary gland obstruction.[6] Marchal et al[7] reported their initial experiences with sialendoscopic techniques in 2000. Marchal modified the sialoendoscope to a semi-rigid 0 degree telescope and this is popularly used till date. A series of dilators were also introduced for a non traumatic dilatation of the Ostia of the salivary duct. Zenk et al[8] published his experience with a new type of sialoendoscope with a built in channel for instrumentation in 2004. Since 2007 Iro et al have collaborated with Stortz and was using an endoscope that resembles the Marchal scope apart from having straight tip.

The last two decades have seen tremendous progress in this new field of sialendoscopy, what seemed like an impossible feat for the last century is now a routine surgical procedure. As with all surgical procedures there is still scope for improvement in technique as well as instrumentation, especially so due to the recent introduction of this surgery and the ongoing advancements in telescopes and instrumentation.

Research to improve the efficacy of sialoendoscope is ongoing.

In the developmental era of endoscope, and with revolutionary changes sialendoscopy helps in understanding role of it in management of diagnosis and treatment of chronic obstructive salivary gland diseases.

The overall aim of the study was to study the role of sialendoscopy in management of chronic obstructivesialadenitis and to correlate the effectiveness of sialendoscopy with pre operative symptoms, post-operative relief, complications and follow up of the patient.

MATERIALS AND METHODS

The present study was performed on 30 cases who visited to the Department of Otolaryngology, Topiwala National Medical College and BYL Nair Charitable Hospital, Mumbai in the period of one year from August 2016 to August 2017. Approval from Institutional ethical committee was taken before initiation of the study. Written informed consent was taken from all the study participants.

Patients who were clinically and ultrasonography suffering fromobstructive salivary gland diseases were included in the study. Patients having acute sialadenitis, mumps, previously operated salivarygland disease, salivary gland malignancy involving ductal parenchyma were excluded from the study.

These patients after thorough clinical examination and investigations were managed by the sialendoscopy. Sialendoscopy was used both as a diagnostic procedure and for therapeutic intervention when a diagnosis of chronic obstructive sialadenitis was made.

Most patients in whom intervention was contemplated were admitted for Evaluation. A thorough ENT examination was performed. The patient was then subjected to routine investigations for anesthesia fitness and special investigations depending on the individual case. Therapeutic intervention when required was done in the same sitting as the diagnostic sialendoscopy.

Patients were given appropriate post-operative care and followed up for a period of 6 months. Repeat check sialendoscopy was done for appropriate cases.

Diagnosis: Features seen on diagnostic sialendoscopy in the affected salivary duct that were diagnostic of obstructive salivary gland disease were presence of calculi (sialoliths) in the duct, stenosis of segment of the duct, generalized narrowing of the duct, protenaceous material in the lumen of the duct, stenosis at the otia of the duct and adhesions seen in the duct.

Patients were classified into two groups on the basis of the findings.

Group A: chronic sialadenitis with sialolithiasis with presence of calculus or sialoliths in the salivary duct.

Group B: chronic obstructive sialadenitis without sialolithiasis. These patients were diagnosed with either stenosis of a segment of the duct, proteinaceous material in the lumen of the duct, stenosis at the Ostia of duct and adhesions seen in the duct.

Treatment: All patients diagnosed with obstructive salivary gland disease were subjected to interventional sialendoscopy in the same sitting as the diagnostic sialendoscopy Sialolithiasis-interventional sialendoscopy with use of one or more of the following burr, basket and forceps. Burr was used to fragment the stones. Basket and forceps were used to retrieve the stone in toto or piecemeal. In case of stenosis, generalized narrowing and adhesions, dilatation was attempted with the help of balloon catheters. In addition, stent was kept in situ in these patients proteinaceous material was flushed out with irrigating solution during sialendoscopy.

Surgical technique:

1. Patient was taken under general or topical anaesthesia.
2. Operating microscope was used to visualize the Ostia of Wharton's or Stemson's duct.
3. Serial dilation of Ostia was performed using conic dilator and serial dilator alternately.
4. Guide wire 0.4 mm passed through the 1.2 mm diagnostic channel which was threaded over the guide wire then it was removed.
5. Marchal's semi-rigid sialoendoscope was introduced and sialendoscopy done under continuous irrigation with steroid Solution.
6. If therapeutic intervention was required, 1.2mm× 1.7mm working channel was introduced.
7. Basket/burr/forceps introduced through the working channel as required.
8. Sialoendoscope removed and Stent was kept in the duct whenever required.
9. 5% Hydrocortisone injected into the duct.

Postoperative care: All patients received postoperative course of oral antibiotics and

steroids. They also received sialogogues [vitamin c and non-steroidal anti-inflammatory drugs. Massage of the affected gland was started immediately in postoperative period.

Additional treatment: Stent was kept in situ in the affected salivary duct at the end of the procedure 2 Patients with stenosis. In these patients stent removal was done 2 weeks post-operatively. Sequelae of the procedure including post-operative swelling and pain were noted and Post operative complications were examined. All patients were followed up for a minimum of 6 months after sialendoscopy, repeat sialendoscopy was done for patients who developed symptoms after first procedure

RESULTS

Out of the total 30 cases studied, we studied the patients in age range between 0-70 years. The youngest patient was 7 years and the oldest 61 years. The age and sex distribution of patients were shown in the Table 1.

11 patients had involvement of parotid gland (left 5, right 3, and bilateral 3) and *19* patients had submandibular gland (right 6, left 9) as shown in Table 2.

8 patients with parotid involvement and 9 with submandibular involvement were diagnosed with chronic sialadenitis without sialolithiasis. 3 patients with parotid while 10 patients of submandibular gland found sialolithiasis involvement. The diagnosis was on the basis of ultrasonography and confirmed with diagnostic sialendoscopy as mentioned in the Table 3.

26 out of 30 patients experienced pain associated with salivary gland swelling. 10 patients with parotid swelling and 17 patients with submandibular swelling experienced increase in size of gland. Eight patients with parotid swelling and 16 with submandibular swelling relieved symptoms on the massage of the respective area. All 8 patients with parotid swelling and 14 patients with submandibular swelling had history of repeated attacks of acute sialadenitis. 3 patients with submandibular swelling and 2 with parotid swelling had history of passing stone in saliva. 2 patients of submandibular and 1 patient with parotid involvement complained of passing pus discharge in saliva. These findings demonstrated in the Table 4.

In 28 out of the 30 patients in our study, the affected major salivary gland was palpable. In two patients with bilateral submandibular gland involvement the gland was not palpable on clinical examination. In 7 patients with submandibular sialolithiasis, the sialoliths was palpable. Parotid duct sialoliths were not palpable on clinical examination in this study. On intra-oral examination, Ostia of the affected salivary gland was prominent in 7 patients with parotid sialadenitis and 11 patients with submandibular sialadenitis. There was pus discharge seen at the Ostia of the affected duct on applying external pressure over the glands in 4 patients. (Table 4)

Table 5 demonstrated that 54% of patients had symptoms of less than 6 months and another *30%* had symptoms lasting from 6 months-12 months. 16.66% patients had symptoms lasting more than 12 months. 5 were suffering from hypertension, 3 patients were suffering from submucous fibrosis. 3 patients were diabetic and 2 patients were suffering from hypothyroidism. 1 had bilateral moderate sensorineural hearing loss.

All 30 patients underwent an ultrasonography of the neck prior to sialoendoscopy.12 patients were diagnosed with sialolithiasis, 10 of them in the submandibular gland and 3 of them in the parotid gland. 4 patients were diagnosed with stenosis, 2 in submandibular and 2 in the parotid duct. 1 patient was diagnosed with micro abscess in the parotid gland. 9 patients were diagnosed to have bulky glands, 4 of these patients had parotid involvement and 5 had submandibular gland involvement. In 3 patients, the ultrasonogram was reported as normal.

13 out of 30 patients had an additional computed tomography of the neck done 9 patients with submandibular sialolithiasis. 3 patients were diagnosed with parotid sialolithiasis and 1 patient diagnosed with submandibular sialolithiasis on ultrasonography was found Ostia stenosis with debris collection in submandibular duct due to false positive report. All these investigations are explained in Table 6.

Proteinaceous material was seen to fill the entire length of the duct in 3 patients with parotid sialadenitis and *5* patients *with* submandibular sialadenitis.9 patients with submandibular sialadenitis had calculi in the duct visualized during sialendoscopy.1 patient *with* parotid

sialadenitis and 2 patients with submandibular sialadenitis had stenosis in the duct. 1 patient with parotid sialadenitis and 1 patient with submandibular sialadenitis had stenosis of the duct at Ostia. 3 patients with parotid sialadenitis while one patient had generalized narrowing of the duct and another patient had adhesions in submandibular duct. All these intra-operative findings were described in Table 7.

In 3 patients with submandibular duct Ostia were slit before sialendoscopy to retrieve large submandibular stone near to Ostia. All patients had post-operative swelling of the gland that lasted for a day. 19 patients had pain in the post-operative period.

The most common complication seen post-operatively was swelling of the involved gland lasting for more than a day. This usually settled down in 24 hours and only 7 patients had significant swelling after 24 hours. 6 patients had recurrence of symptoms after sialendoscopy. In our series, no patient had duct extirpation and no patient required emergency gland removal. 2 patients with parotid and 3 patients with submandibular gland involvement underwent repeat sialendoscopy in because of recurrence of symptoms. Table 8 demonstrated procedure**,** sequelae and post-operative complications of sialendoscopy.

Table 1: Demographic distribution of patients.

		Number of patients	Percentage
Age groups (years)	0- 10	2	6.66
	11-20	6	20
	21- 30	10	33.33
	31-40	5	16.6
	41-50	2	6.66
	51-60	3	10
	61-70	2	6.66
Gender	Male	18	60
	Female	12	40

Table 2: side distribution of salivary gland.

Side / Gland	Right	Left	Bilateral	Total	Percentage
Parotid	3	5	3	11	36.66
Submandibular	6	9	4	19	63.33

Table 3: Glands with or without sialolithiasis.

Chronic sialadenitis	Parotid	%	Submandibular	%
Without sialolithiasis	8	26.66	9	30
With sialolithiasis	3	10	10	33.33

Table 4: Distribution of symptoms and clinical findings.

		Parotid	%	Submandibular	%
Symptoms	Gland swelling	11	36.66	19	63.33
	Pain	10	33.33	16	53.33
	Increase with meal	10	33.33	17	56.66
	Relief with massage	8	26.66	16	53.33
	Recurrent attacks of acute sialadenitis	8	26.66	14	46.66
	Passage of stone	2	6.66	3	10
	Pus discharge in saliva	1	3.33	2	6.66
Clinical findings	Gland palpable	11	36.66	17	56.66
	Stone palpable	1	3.33	06	20
	Ostia prominent	9	30	17	56.66
	Pus discharge	1	3.33	2	6.66

Table 5: Duration of symptoms and associated disease.

		No of patients	Percentage
Duration of symptoms	< 6 months	16	53.33
	From 6 mnths-upto 12 mnths	9	30
	>12 mnths-36 mnths	5	16.66
Disease	Hypertension	5	16.66
	Diabetes mellitus	3	10
	OSMF	3	10
	Hypothyroidism	2	6.66

Table 6: Investigations.

		Parotid	Submandibular	Total
Ultrasonography	Normal	1	2	3
	Sialolithiasis	3	10	13
	Stenosis	2	2	4
	Microabscess	1	0	1
	Bulky gland	4	5	9
CT neck	Normal	0	0	0
	Calculus	3	9	12
	Bulky gland	0	0	0
	Stenosis	2	3	5

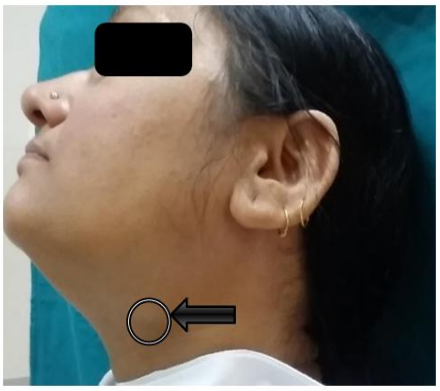
Table 7: Intra-operative findings

Findings	Parotid	Submandibular	Total
Proteinaceous material	3	5	8
Calculus	3	9	12
Stenosis	1	2	3
Ostia stenosis	1	1	2
Generalised narrowing of duct	3	1	4
Adhesions	0	1	1
Total	11	19	30

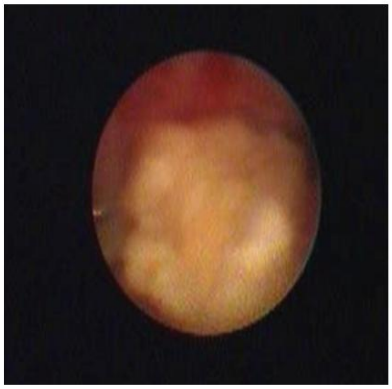
Table 8: Procedure, Sequelae and Post-operative complications of sialendoscopy.

		Parotid	Submandibular	Total
Procedure	Duct slitting	0	3	3
	Procedure abandoned	1	1	2
Sequelae	Swelling < 24 hrs	11	19	30
	Pain	7	12	19
	Swelling > 24 hrs	4	3	7
Post-operative complications	False passage	1	0	1
	Duct extirpation	0	0	0
	Emergency Gland removal	0	0	0
	Recurrence of symptoms	2	4	6
Repeat sialendoscopy		2	3	5

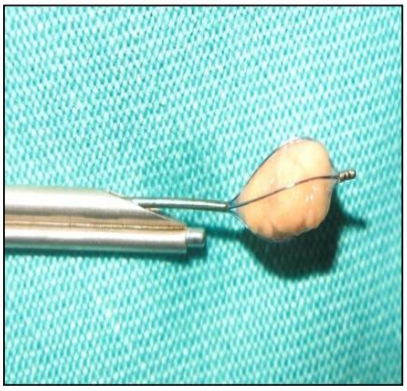
ATLAS



Left Submandibular Sialadenitis



Calculus embedded in the duct



Stone extracted into Basket

DISCUSSION

Our study of 30 cases showed a variety of chronic obstructive sialadenitis. All cases were managed endoscopically. This study brings out certain interesting facts. As sialendoscopy is a relatively new and upcoming surgical technique, a number studies are now emerging from various centres throughout the world. This is one of the initial research studies emerging from our country. Trials in sialendoscopy have mainly developed in European countries and United States of America now recently introduced in India.

The once routine salivary gland excision is now obsolete and gland extirpation is now recommended only when sialendoscopy has failed to benefit the patient. This is according to algorithms of treatment of salivary gland obstructions given by Koch et al.[10]

The age distribution was highly variable with no definite pattern. The common age of presentation was the 3 decade of life whereas P. Capaccio et al observed peak incidence between the ages of 30-60 years.[11] in our study, the most common group of obstructive disease was chronic submandibular sialadenitis with sialolithiasis. 10 out of 30 patients belonged to this group. The next most common was parotid sialadenitis without sialolithiasis with 09 patients. Overall, studies by p. Capaccio et al and M. Andretta et al[11,12] stated that sialolithiasis is the most common cause of chronic sialadenitis which correlated with our study. Previously, sialolithiasis was often managed by traditional methods of stone excision or gland excision. Submandibular duct is the most common site of sialoliths in ourstudy. This correlates to findings of P. Capaccio et al and M. Andretta et al.[11,12] clinically our patients most commonly presented with increase in swelling of gland after meal similar to study called 'meal-timesyndrome'.[13]

Sialendoscopy is associated with very low morbidity. There were not many contraindications to the procedure as it can be done under topical anaesthesia even in patients who are not fit for general anaesthesia. The only important contraindication was an acute episode of sialadenitis. There was a risk of false passage and duct extirpation in these patients. All our patients with acute sialadenitis were given oral antibiotics and anti-inflammatory medication and sialendoscopy was performed only after the condition settled down.

All of our patients underwent an ultrasonography of the salivary glands. This procedure is non invasive, cheap and easily accessible. The etiology of obstruction can be determined. The distance of the stone or stricture from the Ostia and the size of the stone are important measurements that help in planning further management.

Disadvantages were that this is an operator dependent procedure and must be done by an experienced radiologist with interest in salivary gland pathology as there can be variation in reports. Using a sialogogues like vitamin C during the ultrasonography helps in identifying and localizing cause of obstruction.[12,14]

Computed tomography was most helpful to determine size and location of stone. Disadvantages were exposure to radiation, costly and static study.

Previously conventional sialography was considered for diagnosis of sialadenitis but now its absolute as it had disadvantages which included exposure to radiation, pain associated with the procedure, possibilities of ductal perforation, anaphylactic shock, complications of infection. It might tend to push the stone further distal in the canal.[15]

Diagnostic sialendoscopy can accurately detect various pathologies of the ductal system such as primary, secondary and terminal branching of the Stenson's and Wharton's duct can be completely visualize. The pathology once diagnosed can also be dealt within same sitting. The same patient was reported to have sialolithiasis of Wharton's duct on ultrasonography and computed tomography suggestive of Ostia stenosis with debris collection such reduces the confusion. Sialendoscopy confirmed the finding of stenosis. There was no other lesion palpable on intra- oral examination. In this patient procedure was abandoned.

Both diagnostic and therapeutic Sialendoscopy can be safely performed under topical anaesthesia with lignocaine viscous gargles. However, in apprehensive adults and in young children, general anaesthesia was preferred. Local infiltration of 2% lignocaine with 1.2 lakh adrenaline in floor of mouth was done for one patient during duct slitting procedure as patient complained of discomfort and pain.

Proteinaceous material in the lumen of the duct was one of the intra-operative finding causing duct obstruction. In patients with proteinaceous material and mucous plugs, the continuous irrigation during the procedure flushes out all the debris present in the duct. The irrigation also causes dilatation of the duct relieving the patient of obstructive symptoms.[14] In these patients no further intervention was required.

In patients with sialolithiasis calculus or sialoliths was fragmented when necessary with the help of burr. Baskets and forceps specially designed for sialendoscopy were used to retrieve the stone in toto or piecemeal. 2 out of 9 patients required duct slitting of the submandibular duct before the calculus could be removed. This was because the stone was large and located too close to the Ostia and the sialoendoscope could not be passed in to retrieve the stone safely. After removal of stone by duct slitting, sialoendoscope was introduced and smaller stones lying distal in the duct were then removed. A similar combined approach technique has been described by Rohan R Waiwekar et al.[16]

Two patients diagnosed with focal submandibular stenosis and 1 patient diagnosed with focal parotid stenosis along with 4 patients with generalized narrowing of the duct underwent endoscopic dilatation. This was done with the help of balloon Catheters. Stent was kept in the duct after the procedure for 2 weeks. Similar procedure was done for 1 patient with adhesions in the submandibular duct. 2 patients had stenosis of the Ostia. The Ostia were too narrow even after dilatation and the sialoendoscope could not be passed in these patients. The procedure was abandoned to prevent trauma which would cause more fibrosis and worsen the stenosis.

There is continuous irrigation of steroid solution during the procedure. This causes post-operative swelling of the enlarged gland and pain as sequelae seen in all patients. The swelling usually settles due to natural flow out of the salivary duct with saliva. However, 7 of our patients had significant swelling beyond the first 24 hours.

In 1 patient with false passage was suspected intra-operatively and the procedure was not continued further. 6 patients had recurrence of symptoms after sialendoscopy. Patients complained of attack of swelling of the affected gland with pain. Out of these patients, 5 patients underwent check sialendoscopy. One patient refused repeat sialendoscopy procedure. Repeat sialendoscopy was done 6 months after the first procedure. Residual stones were removed and in case of stricture repeat dilatation was performed. The recurrence rate is high when compared to Nahleili et al[17] who reported a failure of 6%, however considering the recent introduction of this technique and the relative novelty of the procedure, better results can be expected with progress of time.

Sialendoscopy has low morbidity. There is no extensive surgery involved, no blood loss and no external incision were required. The risk of neurological damage of facial nerve associated with traditional approaches to major salivary glands is not seen with this minimally invasive approach. Hence this procedure is safer to perform. The major complication with sialendoscopy is stripping of the duct-duct extirpation which needs emergency excision of the gland. We did not come across this complication in our study. The patients need lesser hospital stay, so much so that diagnostic procedures and interventional procedures under topical anaesthesia can be managed as day care procedures.

The main disadvantages faced in the management of obstructive salivary gland diseases today is the lack of facilities for training ENT surgeons in sialendoscopy. There are few teaching centers where the facility of sialendoscopy is available. Hence knowledge of this procedure is lagging. Surgeons not trained in this technique will continue to approach the patients with traditional gland-removing surgery.

Also, the equipment used in sialendoscopy is very specific and expensive. Also, due to the high cost of disposable equipment like balloon dilators, guide wires and baskets required for each individual procedure, all patients may not be able to afford the procedure.

Inspite of these limitations, sialendoscopy when accessible and affordable should be considered as the first line of management of patients with chronic obstructive sialadenitis.

CONCLUSION

In the modern day era of endoscopy, salivary gland excision should no longer be treatment of chronic obstructive sialadenitis. It is only considered when sialendoscopy has failed to offer any benefit and the patient has significant disturbing symptoms due to obstruction. Sialendoscopy is useful as a diagnostic tool and therapeutic intervention

Diagnostic sialendoscopy is essential to confirm diagnosis of obstruction in the salivary ductal system. Direct visualization of complete ductal system upto terminal branching is possible and any pathology in the ductal lumen can be accurately diagnosed. Sialendoscopy can be performed safely under topical as well general anaesthesia depending on the particular case and patient preference.

The limitations include lack of training facilities, high cost of starting a sialendoscopy centre and the recurring cost per procedure in terms of disposables like baskets and balloon catheters. This makes the procedure expensive for the patient. The main disadvantages are lack of expertise available to perform the procedure and for training of ENT surgeons in this procedure. This study is a small step in the direction to study and improvise the management of chronic obstructive sialadenitis with sialendoscopy.

REFERENCES

1. Scott brown. Textbook of otolaryngology and head & neck surgery.7th edition. Chapter 144 anatomy of salivary glands. Graham J Cox. 1852-7.
2. Abaham M Baruchin. Modern management preserving the salivary glands 2007- chapter 1 ‘cornerstones, milestones, stepping-stones and stones in the history of salivary glands’. pg. l3- 20.
3. H. Matsen, A. Achillini (1463—1512) and ockhamism at bologna (1490— 1500).J Hist philos 1975; 13: 437—51.
4. Rutkow IM, Hempel K. An experiment in surgical education—the first international. Exchange of residents. The letters of halst ed, kuttner, heuer, and landois. Arch surg.1988, 123:1: 115—21.
5. P. Katz. ‘Endoscopy of the salivary glands’ Ann Radiol, 1991, 34:1-2:110-3.
6. O. Nahiieli, A Ender., AM Baruchin. ‘Salivary gland endoscopy a new technique for diagnosis and treatment ofsialolithiasis.’ Journal Of Oral Maxillofacial Surgery. 1994, 52: 12: 1240- 2.
7. F. Marchal, P. Dulguerov, M. Becker, W. Lehmann. How I Do It: Interventional Sialendoscopy.’ Laryngoscope. 2000; 110:318-20.
8. J. Zenk, M. Koch, A. Bozzato., H. Lro ‘Siaiodoscopy- initial experiences with anew endoscope’ british journal of oral maxillo facial surgery. 2004;42(4).293-8.

9. J. Harrison.' Causes, natural history and incidence of salivarystones Otolaryngology clinics of North America— sialendoscopy and lithotripsy'. 2009. 42: 5: 933-9.

10. M. Koch, J. Zenk, H. Lro. 'Sialendoscopyand Lithotripsy'. Otolaryngology clinics of North America algorithms for treatment of salivary gland obstruction. 2009, 42: 5:1173-92.

11. P. Capaccio, S. Torretta, F. Ottaviani, G. Sambataro, L. Pignataro. 'Modern management of obstructive salivary diseases.' Acta Otorhinolaryngol Ital 2007; 27:161-72.

12. M. Andretta, A. Tregnaghi, V. Prosenikliev, A. Staffieri. 'Current opinions in sialolithiasis — diagnosis and treatment' acta otorhinolaryngol ital. 2005, 25:145-9.

13. M. Esculier, M. Pregrel. Atlas of oral and maxillofacial surgery clinics of North America. Philadelphia Pa Saunders: the current status and possible future for lithotripsy of salivary calculi. 1998. 117-32.

14. W. Urban. Geisthoff. 'Basic sialendoscopy techniques'.Otolaryngology Ciinics of North America - sialendoscopy and lithotripsy.2009. 42: *5:* 1029- 52.

15. F. Marchal, P. Dulguerov, 'Sialolithiasis management the state of the art'. Arch Otolaryngol Head Neck Surg. 2003, 129:951-6.

16. RR. Walwekar, D. Patrick. BA Tyler, N Tammareddi, G Peters, 'Robotic-assisted transoral removal ofa Submandibular megalith'. Laryngoscope. 2011, 121: 3:5347.

17. O. Nahlieli., AM. Baruchin, 'long-term experience with endoscopic diagnosis and treatment of salivary gland inflammatory diseases'. Laryngoscope, 2000, 110:988-93.