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Original Article

Caldwel-Luc operation without intranasal antrostomy

AKM Asaduzzaman[1], Md. Rafiquzzaman[2], Mani Lal Aich[3], Md. Abdul Mannan[4], Md. Rabiul Alam[5], Md. Tauhidul Islam[6], M A Rouf Sarder[7]

Abstract:

Introduction: Sub-labial antrostomy also known as Caldwel-Luc operation is a well-accepted procedure to remove any diseased mass, organic tissue or non-organic foreign body from maxillary antrum. The proceedings of this operation are though complex but not complicated if done by an expert hand. In addition to sub-labial approach this procedure is followed by an intranasal antrostomy to facilitate future drainage and through which the antral pack is introduced and removed post-operatively.

Methods: In our series of 30 patients, we performed the same procedure through sub-labial approach only. No intranasal antrostomy were done. Also we opened the antrum by a small hole made over antero-lateral wall of the antrum.

Results: The adopted method decreased the post-operative morbidity and also reduced the period of healing. No patient developed any major complication like oro-antral fistula either on immediate or long term follow-up up to one year. Only one (3.33%) patient had a temporary obstruction in drainage of collection in antrum even after not performing the intranasal antrostomy.

Conclusion: Thus we conclude that this modification of Caldwel-Luc operation only through sub-labial approach without performing intranasal antrostomy could be accepted as an innovative procedure for better outcome of the patients as well as its cost-effectiveness.

Key words: *Caldwel-Luc operation; intranasal antrostomy*

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1. Graded Specialist in Otolaryngology, Combined Military Hospital, Dhaka, Bangladesh.
2. Classified Specialist in Otolaryngology, Combined Military Hospital, Comilla, Bangladesh.
3. Assistant Prof., ENT - Head & Neck Surgery, SSMC & Mitford Hospital, Dhaka, Bangladesh.
4. Professor & Head, Dept of Otolaryngology, Armed Forces Medical College, Dhaka, Bangladesh.
5. Classified Specialist in Anaesthesiology, Combined Military Hospital, Chittagong, Bangladesh.
6. Graded Specialist in Otolaryngology, Combined Military Hospital, Chittagong, Bangladesh.
7. Associate Prof., ENT - Head & Neck Surgery, Bangladesh Medical College, Dhaka, Bangladesh.

Address of Correspondence: Lt. Col. AKM Asaduzzaman, MBBS, DLO, MCPS, FCPS, Graded Specialist in Otolaryngology, Combined Military Hospital, Dhaka, Bangladesh. Mobile: 880-1816 951934, Email: asad100780@ gmail.com

Introduction:

Sinus surgery probably originated from the time of the New Kingdom of ancient Egypt. Instruments were used to remove the brain through the nose as a part of the mummification process. The interest in the pathology of the maxillary sinus started to rise in the 17th century. Antral trephination for suppuration was the most common maxillary sinus operation in that period. An oro-antral fistula was often created by the extraction of a molar tooth to drain the infected maxillary sinus daily. Later on the anterior wall of the maxillary sinus was opened through the canine fossa and was kept open for irrigation[1].

Caldwel in 1893, Scanes Spicer in 1894 and later Luc in 1897 closed the canine fossa incision after an intranasal antrostomy for the removal of the infected mucosa. This Caldwel-Luc procedure is still the most commonly used maxillary sinus operation[2].

The controversy concerning the indications for intranasal antrostomy versus the Caldwel-Luc operation has been debated for many years. Arguments against the Caldwel-Luc procedure are primarily based upon the morbidity of the procedure, while arguments against intranasal antrostomy point to inadequate access, exposure and failure to eradicate the disease[3].

Methods:

This prospective study was carried out on 30 cases operated for maxillary antral polyp in Combined Military Hospital, Chittagong during the period from March 2006 to February 2009. All the operations were done under general anaesthesia. Selections of cases were made randomly after proper diagnosis by obtained history, clinical findings and radiological investigations. Informed consents were taken duly from the patients after thorough explanation of the adopted new procedure.

Patients were reported to ENT OPD with the complaints of headache with heavy feeling in head which aggravated in forward bending. There were symptoms of nasal obstruction, intractable sneezing and nasal discharge. Few patients had also symptoms of epistaxis. On clinical examinations, there were inflamed, thick and/or pale oedematous nasal mucosa, and nasal crusting etc. Radiological investigations of nose and paranasal sinuses were found antral polyp, dentigerous cyst, or opaque antrum due to repeated sinus infections.

Sub-labial antrostomy was performed by a small hole above canine fossa, which was sufficient to remove the polypoidal mass in piecemeal. The mucosa of antral cavity was totally removed. Spontaneous haemostasis was observed after complete removal of mucosa. No intranasal antrostomy was done. Cavity was then packed with ribbon gauge, soaked with neomycin ointment. The pack was removed through the same incision by which the cavity was approached. Rest of the incision was closed by 2/0 chromic catgut. The ribbon pack was usually removed on the post-operative period by expert hand. Then after achieving the optimum criteria the patients were discharged from the hospital and kept on long term follow-up in two months interval for one year.

Results:

Among the patients 18 (60%) cases were male and 12 (40%) were female (Table-I). The age difference among the patients is shown in Table-II. Most of the patients were between 31-40 years of age (70%). The varieties of clinical presentations, finding of radiological investigations and postoperative outcome among the population are shown in Table-III, Table-IV and Table-V respectively. The analyses of the findings were not statistically significant.

Table-I
Sex distribution (n = 30)

Sex	No of cases	Percentage of cases (%)	*p*-value
Male	18	60	<0.05
Female	12	40	

Table-II
Age distribution (n = 30)

Age in years	No of cases	Percentage of cases (%)	*p*-value
11-20	06	20	
21-30	09	30	<0.05
31-40	12	40	
41-50	03	10	

Table-III
Clinical presentations (n = 30)

Clinical presentations	No of cases	Percentage of cases	*p*-value
Nasal obstruction	30	100	<0.05
Nasal obstruction (Right)	16	53.33	Nasal
obstruction (Left)	14	46.66	
Nasal discharge	30	100	
Headache	18	60	

Table-IV
Radiological investigations (n = 30)

Investigation	No of cases	Percentage of cases (%)
X-ray PNS OM view	30	100
X-ray nasopharynx lateral view	30	100
CT Scan	04	13.33
Positive Investigation	30	100

PNS: paranasal sinuses; OM: occipito-mental

Table-V
Post-operative outcome of the cases

Complications		No of cases	Percentage (%) of cases	*p*-value
Immediate	Bleeding / Epistaxis	02	6.66	<0.05
	Hindrance of antral discharge	01	3.33	
	Facial swelling	28	93.33	
	Infection	01	3.33	
Long-term	Hyperesthesia over operational site	04	13.33	
follow-up	Paresthesia to upper alveolar teeth	03	10	
	Oro-antral fistula	0	0	
	Recurrence of disease	0	0	

Recovery was successful in almost all the patients. Facial swellings (93.33%) were developed from 2nd post-operative days (POD) which were usually subsided on the 5th POD (Table-VI). The incidence and area of facial swelling following this small sub-labial incision was less than those of the large opening antrostomies which requires also longer time (often 7 days) to subside. Healing of incisional wounds was excellent and no patient developed oro-antral fistula on long term follow-up. Two patients (6.66%) developed active bleeding as immediate post-operative complication and managed accordingly. Proper antibiotics were administered among the cases, even after that, one (3.33%) case

was infected and treated successfully with an additional antibiotic. Recurrence of disease was not observed in any patient. Discharge from antrum was not hindered in stead of not performing the intranasal antrostomy except in one (3.33%) case. Few patients complained of hyperesthesia over the operational site (13.33%) and paresthesia to upper alveolar teeth (10%), which usually recovered spontaneously after four to five months.

Discussion:

Intranasal antrostomy is designed to remove irreversibly damaged mucosa of the maxillary sinuses and to facilitate gravitational drainage and aeration via an inferior meatal antrostomy. In our modified procedure of Caldwel-Luc operation the intranasal antrostomy was not done. This was done on the basis that intranasal ciliated mucosal regeneration occurs from nasal mucosa and all the normal mucociliary beating occurs towards the natural ostium, whereas when an artificial ostium is made by antrostomy, this favourable phenomenon becomes ineffective[4 - 6]. Moreover, an institutional large scale review on post-operative follow-up following intranasal antrostomy reported the complications like dacryocystitis due to damage to the nasolacrimal duct, injury to the anterior superior alveolar nerve, recurrent nasal obstruction, recurrent sinusitis and recurrent polyposis. Revision antrostomies and intranasal sphenoethmoidectomy were also required in some patients[7, 8]. In addition, this procedure also increases operational time and post-operative morbidity.

In this study, introduction of ribbon gauge through a small hole of antrum in the anterior wall and removal through the same sub-labial incision reduced the post-operative morbidity and enhanced quick recovery. No case as yet had the complication of oro-antral fistula in our series as the closures were made carefully leaving a small gap for the ribbon gauge. The gauges were given for haemostasis and usually removed on 1st POD. Indeed, oral mucosa has a great propensity to quick healing[9]. Even a little gap in soft palate, tonsillar wall heals very quickly. So leaving a mini gap in closed apposition leaves no scope to form a fistula.

Latest technologies have come up to make ease and safe the approach to maxillary sinus surgery with the combination of Caldwel-Luc and powered micro-debrider with angled endoscopes. It is minimally invasive and offers the potential for decreased surgical time, reduced post-operative healing time and reduced post-operative morbidity[10]. But it is highly cost-effective and still has some limitations[11].

Conclusion:

Commonly performed sub-labial antrostomy or Caldwel-Luc procedure may be improvised by doing small opening over the antral wall. No added intranasal antrostomy is required which prolonged the procedure, produces more chance of complication as well and has no long term benefit. Removal of haemostatic pack through the same incision sub-labialy reduces the morbidity of the operation where no case of oro-antral fistula formation observed even after long term follow-up.

So this modification of procedure will reduce the operational time and post-operative morbidity. It reduces the operational wound healing time and has also less chance of complications. Thus we conclude that this modification of Caldwel-Luc operation only through sub-labial approach without performing intranasal antrostomy could be accepted as an innovative procedure for better outcome of the patients as well as its cost-effectiveness. The study recommends further large scale study before advocating the generalisation of this adapted procedure.

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