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Study of Surgical Management of Chronic Sinusitis by Middle Meatus Antrostomy and Antral Wash out Procedure

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Abstract
Introduction*- clinical presentation as chronic Maxillary sinusits in ENT OPD is very common. The clefts and the narrow space in the lateral wall of nose osteomeatal complex plays a key role in pathophysiology of sinuses. Sinusitis is the disease secondary to impaired drainage of sinuses leading to inflammation. our study has taken patients of chronic maxillary sinusitis categorized on the basis of duration of disease more than 8 weeks and acute exacerbation or recurrent sinusitis 3-4 episodes per year lasting for 2 weeks duration. Diagnosis of sinusitis is based on clinical features, diagnostic nasal endoscopy and Radiological evidences. Failing with Medical treatment we treated these cases with Antral Wash Out and Middle Meatal Antrostomy. We compared the outcome of two surgical options. The outcome of these procedure compared for early relief and recurrence after surgery. our Aim of study is to find out the usefulness of antral Wash out at present in the era of Functional endoscopic sinus surgery and the objective is to compare the out comes of antral wash out and Middle Meatal Antrostomy.*
Methodology*-The study involved the evaluation of 54 patients from department of ENT, Government Medical college Ambikapur with clinical features of chronic maxillary sinusitis after evaluating inclusion and exclusion criteria with consent. A total of 47 patients underwent antral wash out, 6 of them with bilateral involvement and 13 patients underwent Middle Meatal Antrostomy , 6 of them were the failure of repeat antral wash out. Antral wash out performed under local anaesthesia with Lichtwitz' trocar and canula using normal saline by 50cc syringe or Higginson's syringe. Middle Meatal Antrostomy done under local anaesthesia mostly by packing nasal cavity and Nerve blocks , after identification of natural ostium with probe uncinectomy and irrigation suction of maxillary sinus done. Follow up of cases done on 14th day,3 months, 6 months and 1 year. Presence of symptoms or no change in endoscopic findings, radiological findings considered as the failure of the procedure and the result of both the procedures compared .*
Result*- There was 51.06% success with antral wash out but with long duration medical treatment and repeat antral wash out the result came up to 87.23 %. Failure of antral wash out observed only 12.76% in our study after follow up and treatment. Result of Middle Meatal Antrostomy in our study is 84.62 %, No improvement after Middle Meatal Antrostomy in 15.38% . Overall outcome of Middle Meatal Antrostomy was 84.62% .*
Conclusion*- Middle Meatal Antrostomy and Antral wash out provides equal improvement but antral wash out is a simple procedure but has more recurrence. With regular follow up outcome of antral wash out can be achieved by repeat antral wash out and Medical Treatment. Overall in our study Middle Meatal Antrostomy procedure has a better result in relieving symptoms of chronic maxillary sinusitis.*
Keywords*- Chronic Maxillary Sinusitis, Antral Wash Out, Middle Meatal Antrostomy (MMA.*

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I. Introduction

Sinusits refers to a disease of paranasal sinuses due to inflammation of sinus mucosa, which is categorized on the basis of duration as acute sinusitis-1 week to 4 week duration, subacute sinusitis-4 weeks to 8 weeks duration and chronic sinusitis as more than 8 weeks and recurrent sinusitis or acute exacerbation of sinusitis is defined as more than 3- 4 episodes per year lasting for less than 2 weeks. sinusitis usually occurs in cold and wet atmosphere, pollution, smoky , dusty environment and overcrowding. Prof. W.Messenklinger[3] (1960/1970) technique for endoscopic exploration of lateral wall of nose and confirms clinical experience that the diseases of large paranasal sinuses are rhinogenic by demonstrating nasal spread to sinuses. The clefts and narrow space in lateral wall of nose, the osteomeatal complex play a key role in physiology and pathophysiology of sinuses.

Roughly 90% of adults have had sinusitis at some point of time in life and the Frequency of chronic type infection is the justification of study in view of the serious effects as reported by Pearlman AN et al[15] 2008. Rudmik L,Smith TL[11] 2011 reported that the Global prevalence of chronic rhinosinusitisis around 10.5 % with significant impairment. Sometimes the complication of sinusitis may lead to orbital cellulitis, orbital abscess, cavernous sinus thrombosis and encephalitis which is life threatening. Although with medical treatment most of the patients recover but some patient may require surgical intervention. The main surgical treatment of chronic maxillary sinusitis are antral puncture wash out and Middle Meatal Antrostomy or functional endoscopic sinus surgery. In our study comparison between these two operative options for the treatment of Chronic maxillary sinusitis on the basis of early relief and recurrence, where as some other surgical procedure can be done like intranasal antrostomy, Caldwel Luc's operation and Balloon sinuplasty, but we have limited our study to these two only. Medical treatment tried with specific antibiotics Penicillin, vancomycin, erythromycin, Dicloxacillin, Clindamycin, amoxycillin clavulenic acid, moxifloxacillin as the common bacterias are staphylococcus , streptococcus pneumonae E.coli, Haemophilus influenza, Moraxilla catarrhalis, Streptococcus pyogenes, Klebsiella and Pseudomonas aeroginosa.

Our study focused on the outcome of the two procedures generally done to treat chronic maxillary sinusitis the older method antral wash out or the newer Middle Meatal Antrostomy. The comparison is based on improvement of symptoms, signs by diagnostic nasal endoscopy and the radiological findings recovery.

II. Material and Methods

Patients from the outpatient and inpatient Department of ENT, Government Medical College Ambikapur were taken up in years 2015-2018 for the study after getting approval. Age group of 25 to 50 years old patients of both sexes were taken up for the study. Only patients who were suffering from clinically , diagnostic nasal endoscopicaly and radiologically proven chronic maxillary sinusitis exclusively not responding to Medical Treatment for 6 weeks were selected for the study. Randomized separation study was done after getting the consent from the patient. Patients with acute and subacute maxillary sinusitis, other sinuses sinusitis ,fungal sinusitis, malignancy, orbital involvement, nasal polyposis were excluded from our study. Total of 54 patients with symptomatic chronic maxillary sinusitis were evaluated 47 out of 54 underwent antral wash out and 8 patients underwent repeat antral wash out. 6 patients treated with medicine after symptoms persisted following 1st antral wash out and another 3 patients required medical treatment after 2nd or repeat antral wash out to relieve symptoms, but rest of 6 patients underwent Middle Meatal Antrostomy due to no response of antral wash out and long medical treatment. Including these 6 patient a total of 13 patients were considered for the other modality of treatment Middle Meatal Antrostomy.

Selection of patient was based on clinical features like Rhinorrhea, Headache, Heaviness of Head , Sneezing, Anterior rhinoscopy, Nasal endoscopy and Radiological evaluation X-Ray PNS and CT scan Paranasal sinus in cases of Middle Meatal Antrostomy. Pre operative and postoperative assessment was done by diagnostic nasal endoscopy in which head slightly elevated in supine position after packing with 4% xylocaine with1:100000 dilution of adrenaline examined using 0^0 Telescope performed by three passes. Preoperative and postoperative tomography scans were done and repeated for maxillary sinus grading and scoring (LUND MACKAY).

Antral wash out- For all the patients done under local anaesthesia by inserting 4% xylocaine soaked swab stick in inferior meatus along with 15% Lidocaine surface anaesthesia for nasal cavity. Procedure performed in sitting up position bending foreward Lichtwitz trocar and canula inserted through inferior meatus into maxillary antrum, irrigation of normal saline done using 50 cc syringe or Higginson's syringe till the clear fluid came out. By doing antral wash out opening of natural sinus ostium established with fluid under pressure and another hole made through inferior meatus to facilitate ventilation of antrum.

Middle Meatal Antrostomy- operation performed mostly under local anaesthesia ribbon gauze soaked in 4% xylocaine with 5μgm /ml adrenaline packed nasal cavity for 30-40 minutes before surgery. Greater palatine block, anterior ethmoidal block and sphenopalatine block given using 26 spinal needle with 2% xylocaine with adrenaline. Along with local anaesthesia sedation given using Midazolam 1-2 mg/kg. For few patients procedure performed under general anaesthesia depending on the ability to withstand the operation. The operation done using 0^0,30^0 and 70^0 rigid 4mm telescopes, identification of maxillary ostium with ball probe , uncinectomy performed using back biting forcep by removing lower 2/3rd horizontal part and part of vertical part. Then complete toileting of maxillary sinus by irrigation and suction done. Anterior nasal packing and antral packing done to check the postoperative epistaxis with ribbon gauze or merocel which was removed after 24-48 hours. Patient followed up in 14 days,3 months,6months and 1 year with diagnostic nasal endoscopy, X-Ray and CT Scan to compare to arrive to the conclusion regarding the outcome of both the procedure.

Observation-in our study a total of 47 patients underwent antral wash out. 32 patients were males and 15 patients were females, .41 patients were suffering from unilateral chronic maxillary sinusitis while 6 of them with bilateral involvement.

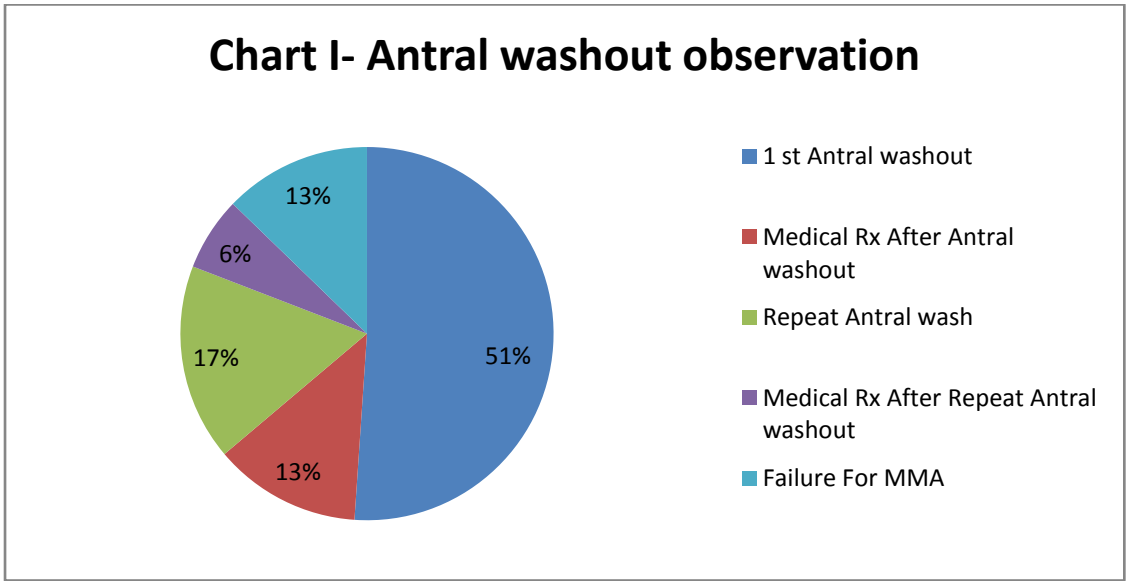
Table I- Age and Sex distribution for Antral wash out of patients-

Sex	Unilateral	Bilateral
Males	27	5
Females	14	1

Total of 24 patients out of 47 recovered after antral wash out. 6 patients required medical treatment for long duration and relieved of their symptoms.17 patient out of 47 needed repeat antral wash out of which 9 recovered after second sitting. But 8 patients again presented with same symptoms and medical treatment given to them symptoms of 3 out of 8 patients relieved. Rest of 6 patients underwent Middle Meatal Antrostomy after failure of antral wash out.

Table II-Showing treatment modality for Antral wash out patients-

Treatment recieved	number	%
Antral wash 1st	24	51.06%
Medical Rx	06	12.76%
Repeat Antral wash	08	17.02%
2nd Time Medical Rx	03	6.38%
Middle,Meatal Antrostomy	06	12.76%



Out of 13 patients underwent Middle Meatal Antrostomy 10 patients were male and 3 patients females, all with unilateral involvement, 6 patients were due to failure of repeat antral wash out and for another 7 cases were new, directly Middle Meatal Antrostomy done without trial with antral wash out. all patients underwent Middle Meatal Antrostomy relieved completely after operation except 2 patients out of 13 required extended medical treatment. Postoperative complication Synechiae observed in 2 patients 15.38% and with minimal Epistaxis.

Table III-Sex distribution for Middle Meatal Antrostomy-

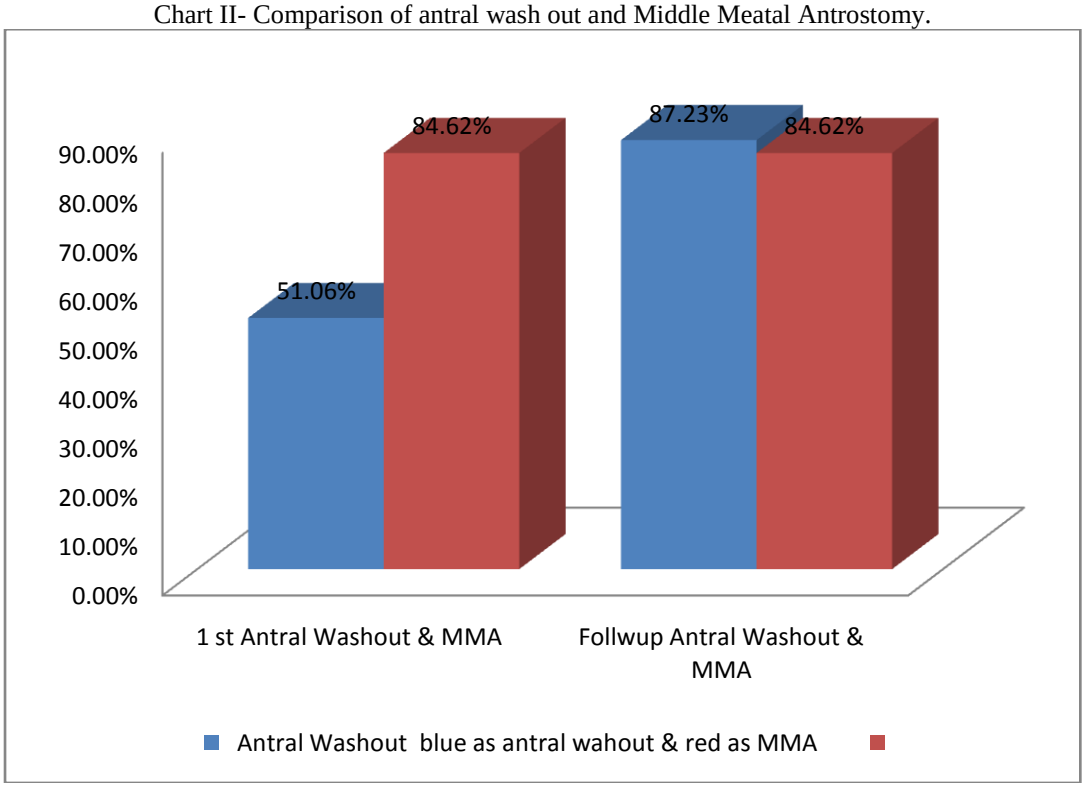
Middle Meatal Antrostomy	Number
Males	10
Females	03
Total	13

III. Result

In our current study included 54 patients predominantly males. there was 51.06% success with antral wash out but with long duration medical treatment and repeat antral wash out the result came up to 87.23 %. Failure of antral washout observed only 12.76% in our study. Result of Middle Meatal Antrostomy in our study

is 84.62 %, No improvement in 3 Patients after surgery and treated with medical treatment after Middle Meatal Antrostomy in 15.38% cases. Overall outcome of Middle Meatal Antrostomy was 84.62% .

Chart II- Comparison of antral wash out and Middle Meatal Antrostomy.



IV. Discussion

Our study included 54 patients of chronic maxillary sinusits after failure with medical treatment underwent surgical intervention by old technique antral wash out or newer one Middle Meatal Antrostomy. Prof. Walter Messerklinger[3] (1960/1970) was the one who described the anatomy and physiology of nose and paranasal sinuses also explained the mucocilliary transport in sinuses which is a genetically predetermined and towards the natural ostium. sinusitis is the disease secondary to impaired drainage.

All the patients were investigated with X-Ray PNS following symptoms of Headache, Heaviness of head, Rhinorrhea and Nasal blockage. According to the study conducted by Y Bajaj et al[7] 2007 Post nasal discharge in 44.30%, Nasal obstruction 81.50%,Sneezing 38.70%, Headache 43.20%,Rhinorrhea 33.70% and Anosmia 83.10% . In the study by venkatachalam V P[13] (1999) found 31.90% (67) cases of sinonasal polyposis and 68.09% (143) of chronic Rhinosinusitis cases with same symptoms. Opacity in maxillary sinus was taken as evidence of chronic maxillary sinusitis.

A total of 47 patients were treated with antral wash out of which 24 patients relieved of symptoms completely which is 51% .other 23 patients were treated further by medical and repeat antral wash out. 12.76% cases relieved of symptoms after treatment with long duration medical treatment. Rest of 36.24% patients were again underwent antral washout, out of which 23.40% relieved of symptoms 6.38% needed long term medical treatment following repeat antral washout. In 12.76% patients were selected for Middle Meatal Antrostomy due to failure of antral wash. study conducted by Muthu Babu et al[8] 2015 20% of patients improved with antral wash out in chronic maxillary sinusitis, while 90% improvement in sub acute maxillary sinusitis. in our study 51% of patients improved after 1st antral wash out, this result improved with long duration medical treatment to 63.83%, with repeat antral wash out to 80.85% and after prolonged medical treatment to 87.23%. the failure may be due to irreversible pathological changes in mucosa includes sinonasal polyposis, oedema,blockage of osteomeatal complex. our study included 32 males ,15 females and 5 males ,1 female with Bilateral chronic maxillary sinusitis, rest of cases were of unilateral disease. All the Bilateral disease improved with antral wash out so in our study total of 53 antral washout procedure done.

In our study 13 patients were included 7 new cases diagnosed without doing antral wash out straightaway middle meatal antrostomy performed, while for other 6 cases antral washout was tried and failed. 3 patients were females and all cases were unilateral disease. 84.60% 11 patients improved with Middle Meatal Antrostomy on the basis of symptoms, endoscopic examination and radiological camparison, 15.40 % did not

improve after surgery and again medical treatment carried out. In study by Muthu Babu et al [8] 2015 the improvement after endoscopic sinus surgery was 90% in chronic maxillary sinusitis and 90% in subacute maxillary sinusitis and the study conducted by Vallur AA et al[6] 2016 improvement following Endoscopic Sinus [2]84.60%.

The result in our study is the comparison between two available modalities of surgical intervention in cases of chronic maxillary sinusitis was 51% in antral wash out and 84.60% in Middle Meatal Antrostomy. with the long duration medical treatment and repeat antral wash result achieved upto 87.23%. Medical treatment for the specific bacteria and according to culture sensitivity administered. Complications of antral wash out includes swelling of cheek, orbital injuries and cellulitis, puncture of posterior antral wall, epistaxis and air embolism but did not encounter any major complication during our study. Bacteria responsible for chronic maxillary sinusitis are staphylococcus (23) , streptococcus pneumonae (12) E.coli (7).Haemophilus influenza (2),Moraxilla catarrhalis (5),Streptococcus pyogenes(3),Klebsiella (2),and Pseudomonas aeroginosa . The medical treatment of Staphylococcos aureus includes Penicillin,Oxacillin,Vancomycin, Erythromycin, Clindamycin, Quinopristin, dalfoprestin and Moxifloxacin Treatment for Streptococcus pneumonae penicillin,Erythromycin, Clindamycin, Quinopristin, dalfopristin, Moxifloxacillin.For Streptococcus pyogenes Penicillin, Erythromycin, Clindamycin, Quinopristin,dalfopristin as reported by the study done by Salvatore Puglishi et al[4] 2011.

In our study there was no improvement in 15.40% cases may be due to as reported by Vallur AA et al[6] 2016 congested mucosa 19.40%, Pale mucosa 30.95%, Nasal polyposis 35.91%, Middle Meatal discharge with turbinate Hypertrophy 23.80% and inferior turbinate Hypertrophy in19.04% and in study by Venkatachalam et al[13] reported Hypertrophy inferior turbinate 10%, Hypertrophied Middle turbinate 17.14% congested mucosa 15.71% sinus tenderness 7.14% and Ethmoidal polyps 12.80%. In the study conducted by Gulati S P et al[14] 2011 a comparative study of MMA with or without partial Middle Turbinectomy observed that without Partial Middle Turbinectomy a result of 75% but postoperative complication synechiae of 25% where as with Partial Middle Turbinectomy the result was increased to 90% and the synechiae formation decreased to 5%. Other common complication following surgery is Epistaxis by many authors due to partial resection but the study reported that there was not any problem of Epistaxis. In our study we observed 07.69% complication minimal Epistaxis, synechiae in 2 patients as compared to other studies .

Table IV-showing comparision of complications-

Author	Year	Complications in %
Venkatachalam	2000	15.2
Y Bajaj	2007	10.9
Vallur A A	2006	9.5
Present study	2019	15.38%

V. Conclusion

Management of chronic Maxillary Sinusitis with Antral wash is quick ,easy and OPD procedure has good outcome but Recurrence rate is higher as compared to Middle Meatal Antrostomy. With regular follow up outcome of antral wash out can be achieved by repeat antral wash out and Medical Treatment for long duration. Middle Meatal Antrostomy and Antral wash out provides equal improvement but antral wash out is a simple procedure , no Hospital stay required and can be done as OPD procedure. Still antral wash out is good intervention for chronic Maxillary Sinusitis but Middle Meatal Antrostomy remains as ideal method for the treatment of chronic maxillary sinusitis. Overall in our study Middle Meatal Antrostomy procedure has a better result in relieving symptoms of chronic maxillary sinusitis.

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