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Comparative study of alkaline nasal douching v/s alkaline nasal douching with gentian violet application inrhinocerebralmucormycosis

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Abstract-
OBJECTIVE- Outcome and prognosis in rhinocerebralmucormycosis depends on many variables, one of them is gentian violet application in alkaline nasal douching. Objective of this study is to know the role of gentian violet application in alkaline nasal douching in post operated case of mucormycosis.
METHOD- At Sir T Hospital and Government Medical College, Bhavnagar, we conducted study of 100 patientswith post-COVID 19rhinocerebralmucormycosis. Patients were divided into two groups for this study. All patients were given alkaline nasal douching post operatively 3 times a day for 2 months. One group was given gentian violet application along with alkaline nasal douching, whereas in another group only alkaline nasal douching was given.
RESULT- With Gentian violet application in alkaline nasal douching, there is less nasal crust formation, patient feels symptomatically better early, less recurrence rate, less mortality ratenand less hospital stay.
Keyword: *Gentian violet, nasal douching, mucormycosis*

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I. Introduction

WHO declared worldwide COVID-19 pandemic on 30thJanuary, 2020. During 2nd wave of covid-19 in India, there was sudden rise of rhinocerebralmucormycosis in post COVID-19 patients in Gujarat, India. Union heath ministry declared mucomycosis epidemic in Gujarat on 20th May, 2021.

Rhinocerebralmucormycosis, is a rare disease caused by filamentous fungi involving nose, paranasal sinus, orbit and brain. It is opportunistic pathogen commonly found in immunocompromised patients. There is increased risk of mucormycosis in patients suffering from COVID-19 especially those with inappropriate steroid therapy, with uncontrolled diabetes mellitus and unhygienic & concentrated oxygen therapy[3]. Fungus grows rapidly and aggressively, causing well defined fulminant and life threatening disease. Early clinical recognition of this potentially fatal disease followed by aggressive debridement, systemic antifungal therapy, and control of underlying co-morbid factors is the mainstay of therapy[4]. Here at Sir T Hospital, all patients of rhinocerebralmucomycosis were started on injectable Amphotericin B therapy and posted for functional endoscopic sinus surgery with debridement. All patients were given injectable amphotericin B for 14-21 days. Alkaline nasal douching was given 3 times a day for 2 months postoperatively. Patients were taught to do nasal douching at home after discharge.

These patients usually develop mucosal swelling, crusting and nasal discharge in post-operative period. These symptoms can last for few days to several weeks following operation. As normal physiology is disturbed, patients are advised nasal douching[2]. Nasal douching seems to reduce crusting of created cavity following debridement and increase early epithelialization [2].It prevents crust formation, hence helps to reduce secondary infection.

Alkaline nasal solution is made by adding one teaspoonful of alkaline powder (sodium bicarbonate one part, sodium biborate one part, and sodium chloride two part) is dissolved in 280ml of lukewarm water. It is used for irrigating the nasal cavities 2-3 times a day.

Gentian violet (GV) also known ascrystal violet and methyl violet is anti-bacterial, anti-fungal, anti-helminthic, anti-trypanosomal, anti-angiogenic and anti-tumor properties. GV has a long history and has been used successfully as monotherapy and an adjunct to treatment in a variety of diseases like trench mouth, thrush, impetigo, burns, pinworms, cutaneous and systemic fungal infection.[1]

In this study, we compared outcome in post-operated patient of mucormycosis with and without gentian violet application in alkaline nasal douching.

II. Materials And Method

INCLUSION CRITERA-

- Patients with age group 18 to 80 years with mucormycosis were screened by detailed history, clinical examination and confirmed by laboratory investigation.
- 100 postoperated cases of mucormycosiswho were conscious and not currently on oxygen support were included in this study.
- Detailed procedure was explained to patients and those patients willing togive written consent were included in this study.

EXCLUSION CRITERIA-

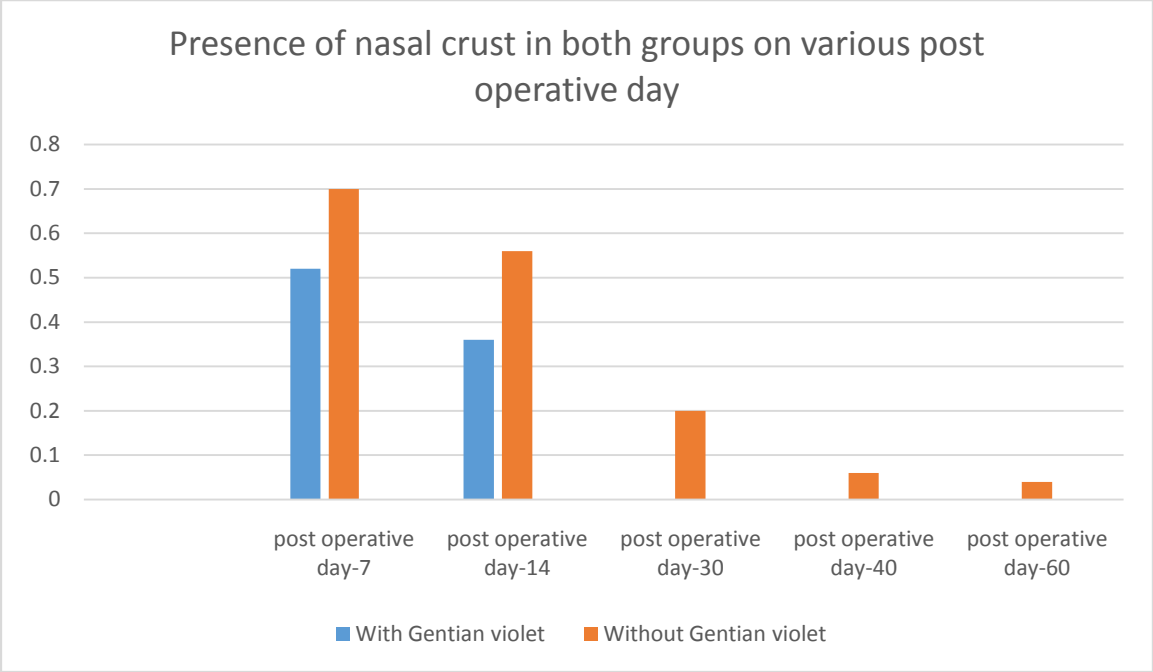
- Patient giving negative consent for participation in this study.

Patients were divided into two groups.All 100 patients were given alkaline nasal douching 3 times a day post-operatively. Among these, 50 patients were given gentian violet applicationintraoperatively and also along with alkaline nasal douching 3 times a day postoperatively. For all patients, nasal endoscopy was done on 7^{th} day, 14^{th} day, 30^{th} day post-operatively and at the end of 2 months to see whether the crusts were present or not.

III. Results

	Presence of crust	
	With Gentian Violet	Without Gentian violet
Post operative day-7	26/50 (52%)	35/50 (70%)
Post operative day-14	18/50 (36%)	28/50 (56%)
Post-operative day-30	00/50 (00%)	10/50 (20%)
Post-operative day-40	00/50 (00%)	03/50 (06%)
Post-operative day-60	00/50 (00%)	02/50 (04%)

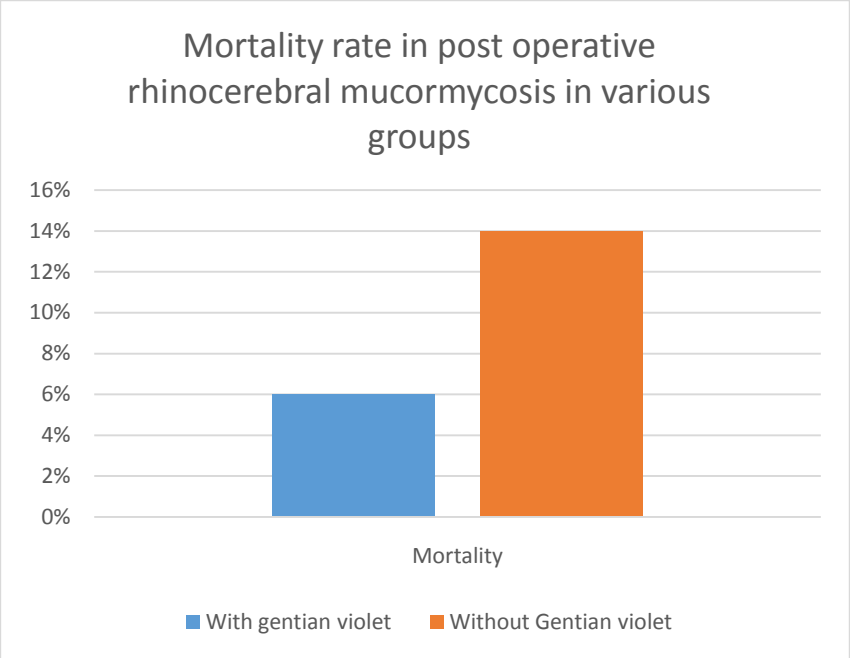
From above table we can see that with gentian violet application, there is less crust formation. One month after operation, there was no nasal cavity crust in gentian violet group.



Above photo showing nasal endoscopy done post operatively to see presence of crust.

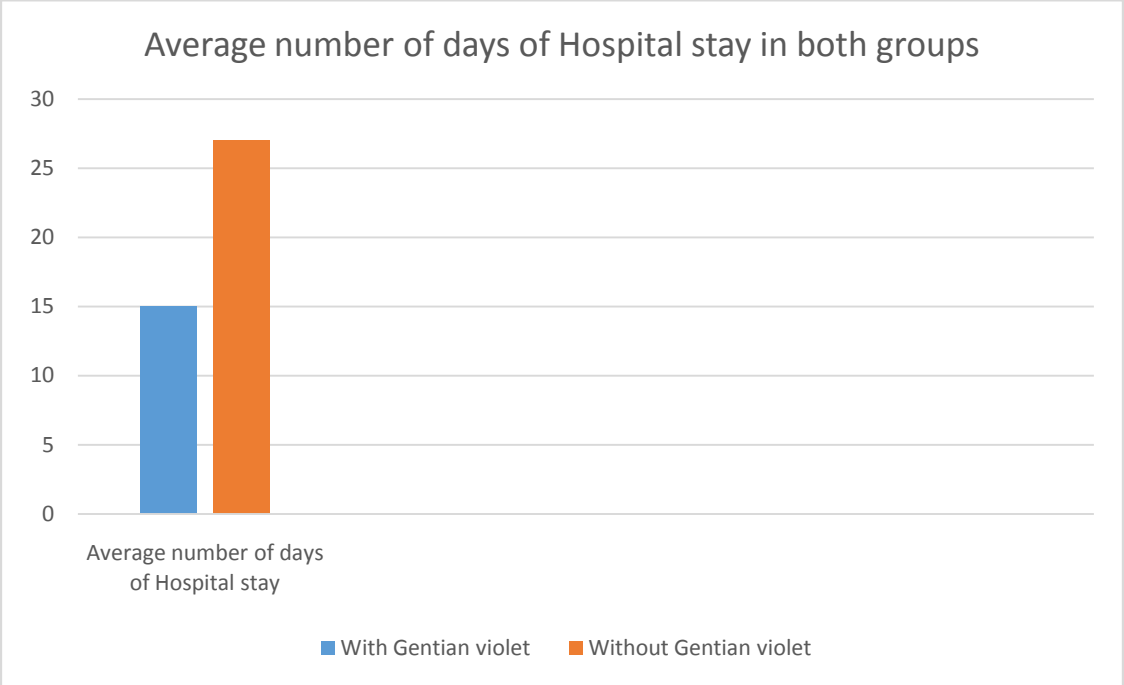
	With Gentian violet	Without Gentian violet
Mortality	03 (06%)	07 (14%)

Above table showing number of mortality in postoperative patientsin respective group



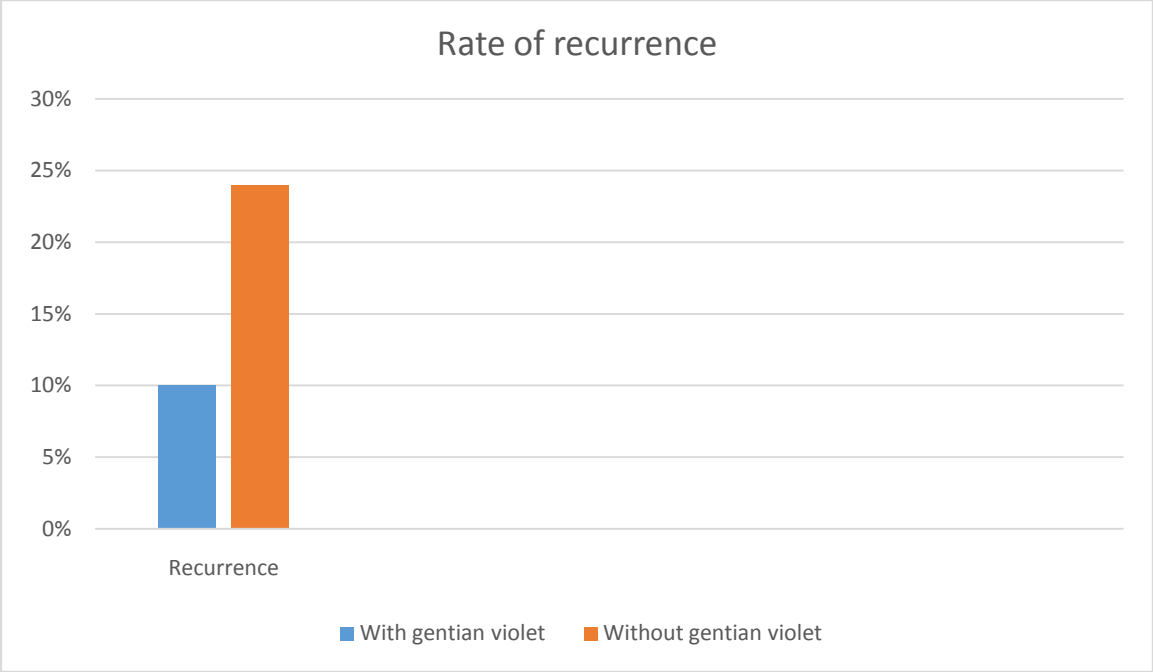
	Average number of days of hospital stay
With Gentian violet	15
Without Gentian violet	27

Above table showing that with gentian violet application, more number of patients were discharged earlier. Patients were discharged on the basis of hygiene, absence of nasal crust, epithelialization of nasal mucosa, disappearance of symptoms, recovery of the patient and completion of injectable amphotericin course.



	With gentian violetapplicaton	Without gentian violet application
Number of patients with recurrence	05	12

Above table shows that number of patients with recurrence is more than double in patients without gentian violet application compared to gentian violet application.



IV. Discussion

Nasal irrigation is old practice of upper respiratory tract care that likely originated in the Ayurvedic medical tradition. It is used alone or in association with other therapies in several condition- including chronic rhinosinusitis and allergic rhinitis- and to treat and prevent upper respiratory tract infection[6]
Study was carried out on 100 patients at Government Medical college and Sir T Hospital, Bhavnagar over a period of 2 months.

The minimum age of the patient in study was 18 year and maximum was 80 years. Maximum number of the patient were in age group 35 to 50 years.
Male comprised 60% and female comprised 40%.

In our study, on post-operative day-7, 52% patients were having nasal crust in Gentian violet group whereas 70% patients were having nasal crust in without gentian violet group. On postoperative day-14, 36% patients were having nasal crust in Gentian violet group whereas 56% patients were having nasal crust in without gentian violet group. On postoperative day-30, nopatients were having nasal crust inGentian violet group whereas 20% patients were having nasal crust in without gentian violet group.
There was drastic improvement in patients with gentian violet application on postoperative day-14 and above. With gentian violet application, there were no crusts seen on postoperative day-30 and above. whereas without gentian violet, nasal crusts were still present in 20% patient on postoperative day-30.

There is 6% mortality rate in Gentian violet group whereas 14% mortality rate without gentian violet group.

We have also observed early discharge in hospital stay of patients with gentian violet application in alkaline nasal douching. Average number of hospital stay in gentian violet group is 15days whereas without gentian violet, it is 27 days.

Without gentian violet application, recurrence rate is more than double with compared gentian violet application.

Study analysed by Harvey at el. in a Cochrane review published in 2007, saline solutions were compared with either no treatment, a placebo, as an adjunct to other treatment or against treatments. Hypertonic versus isotonic solutions were also compared. Conclusions were such that Nasal irrigation was capable of reducing symptoms scores. It also improves corticosteroid efficacy when used in combination.[7]
Liange et al. reported that the addition of nasal irrigation with isotonic saline solution to post operative sinus debridement was effective in improving symptoms scores only in patients with mild chronic rhinosinusitis.[8]

V. Conclusion

From above study we can say that with gentian violet application, outcome and prognosis is better. Patients are being discharged earlier and symptomatically patients are better with Gentian violet application. Recurrence rate is far less with gentian violet application. Mortality rate is also less.

Gentian violet is inexpensive, well tolerated, effective, readily available and easy to use drug. In fact, bacterial and fungal resistance to gentian violet is extremely low. [5].

Hence, proven from above study that gentian violet application in alkaline nasal douching has better outcome and prognosis in post operated cases of rhinocerebralmucormycosis.

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