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Treatment of allergic and vasomotor rhinitis by the local application of different concentrations of silver nitrate

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Abstract

In 1980, Bhargava *et al.* reported a new treatment of allergic and vasomotor rhinitis by the local application of 15 per cent silver nitrate. The results of further studies of the treatment by using different concentrations of silver nitrate ranging from 5 per cent to 25 per cent and normal saline as placebo are presented here; 15 per cent has been found to be the most effective concentration giving successful results in 75.7 per cent of cases. It is applied to the anterior portion of both inferior turbinates and the anterior part of the nasal septum once a week on five occasions.

Best relief was obtained from the most annoying symptoms of sneezing and rhinorrhoea. Asthma was controlled in 50 per cent of such patients who had attacks of allergic rhinitis followed by asthma.

For this widely prevalent disease, the treatment was found to be simple, easy and useful, with negligible side-effects.

Introduction

In 1980, Bhargava *et al.* reported that local cautery of the anterior portion of both inferior turbinates and the nasal septum with 15 per cent silver nitrate was a simple and effective treatment for allergic and vasomotor rhinitis. It was readily accepted by the patients. It involved neither an operation nor any sophisticated equipment. Best relief was obtained from sneezing and rhinorrhoea, the symptoms which exhausted the patient and upset relations, friends and neighbours. In the event of recurrence, treatment could be repeated without difficulty. Histopathology of the inferior turbinate after applications of silver nitrate showed a normal mucous membrane with pseudostratified ciliated columnar epithelium and few mucous glands. The inflammatory exudate was scanty, with a conspicuous absence of eosinophils. There was vascular proliferation and mild fibrosis due to the action of silver nitrate.

Earlier, various local treatments have been described for allergic and vasomotor rhinitis. Zinc ionization was used by Weir (1967) for vasomotor rhinitis, with improvement in 72 per cent of patients, and Puhakka and Rantenen (1977) used cryotherapy for allergic and vasomotor rhinitis with good results in 76 per cent of cases; but in both series, blocking of the nose and rhinorrhoea were the presenting symptoms. Ozenberger (1971) reported that cryosurgery of the inferior turbinates gave improvement in the nasal obstruction, but often there was no change in sneezing or rhinorrhoea.

Gill (1966) injected hydrocortisone intranasally, with success in 84 per cent of cases. Sneezing was a dominating symptom in his series. In the hands of the authors, this treatment has given good results with relief lasting for six months or more, but many patients do not agree to having intranasal injections, as the very idea of injections in the nose frightens them.

The topical application of disodium chromoglycate gives good relief as a preventive, but the effect is short-lived (Holopainen *et al.*, 1971). Similarly the topical use of beclomethasone dipropionate applied as an aerosol gives only temporary relief (Weir, 1974).

Thomson and Negus (1948) had mentioned the use of pure phenol and trichloracetic acid for surface application on inferior turbinates for allergic rhinitis, but they condemned their use because of their destructive action with loss of delicate epithelium and its replacement by scar tissue.

In this presentation, besides 15 per cent silver nitrate, other strengths of silver nitrate ranging from 5 per cent to 25 per cent have been utilized and compared. In five cases, normal saline was applied as a placebo.

Materials and methods

One hundred and thirty cases were selected at random over a period of more than three years for local application of silver nitrate or normal saline. Of these, 113 cases were available for follow-up and are presented in this series. No attempt was made to distinguish between allergic rhinitis and vasomotor rhinitis, but only those cases were selected who were sneezing more than 30 times a day during an attack.

There was a slight predominance of females over male patients, 94.7 per cent of cases were between the ages of 11 and 50 years. The age of eight patients was under 16 years. All the cases had sneezing as a presenting symptom, while rhinorrhoea was present in 94.7 per cent of the cases. 54.9 per cent of patients suffered from headache, and nasal blockage bothered 58 out of 113 cases (50.1 per cent). Fifteen per cent of cases had asthma in addition to allergic rhinitis.

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Seven patients had been treated earlier by intranasal hydrocortisone injections without any relief, while two cases had undergone vidian nerve cautery without any improvement.

The leucocyte count was between 5,000 and 10,000 per mm^3 of blood in 89.4 per cent of cases. The eosinophil percentage in the leucocytes of the blood was up to five in 71.7 per cent of patients, and in seven out of 113 cases, it was more than 10 per cent. Eosinophils were present in the nasal secretions of 62.1 per cent of patients. Intestinal parasites were detected in 15.1 per cent of cases. These cases were included in this series as they had continued to have symptoms in spite of eradication of intestinal parasites and treatment for eosinophilia.

Using a swab stick dipped in silver nitrate, local chemical cautery was performed on the anterior part of the inferior turbinate and the corresponding portion of the anterior part of the nasal septum, over an area of roughly 1 cm^2 at each site (Fig. 1). The procedure was then repeated on the other side. The area to be cauterized was first anaesthetized by spraying with 4 per cent solution of lignocaine. Local anaesthesia was used to reduce the severe sneezing and rhinorrhoea which can occur for some time immediately after application of the chemical. During this therapy, no antihistamines were permitted, as the real effect of treatment would thus be masked. However, a single tablet of antihistamine was permitted one hour before the application of silver nitrate to minimize nasal irritation. The application was not done if the patient was actively suffering from sneezing and rhinorrhoea, or else the application was in the danger of getting washed out. Solutions of silver nitrate older than two months are not recommended.

Results

The treatment was considered to be effective when patients obtained good or fair relief. Cases with 0 to 5 sneezes in a day during an attack were classified as having good results. Patients with 6 to 10 sneezes in a day were grouped under fair results. A poor relief meant more than 10 sneezes in a day.

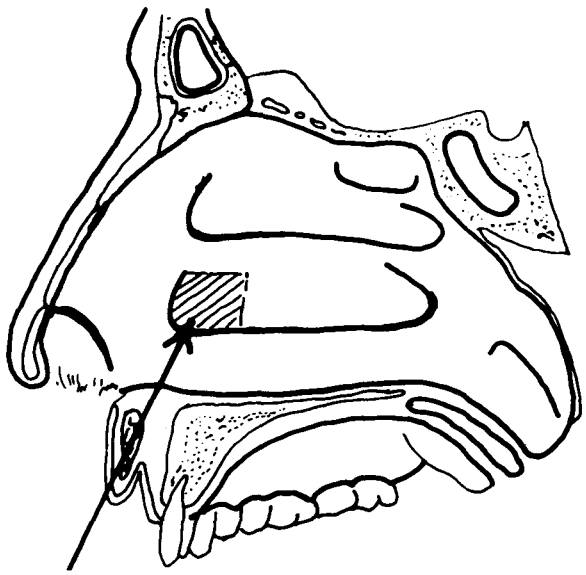

FIG. 1

The figure shows the anterior part of the inferior turbinate where silver nitrate is applied. Silver nitrate is also applied on the corresponding area on the nasal septum opposite to the area of cauterization on the turbinate.

Out of 74 patients, the treatment with 15 per cent silver nitrate was successful in 75.7 per cent of cases, with good relief recorded in 64.9 per cent of cases and substantial relief reported by 10.8 per cent of patients (Table I). The best relief obtained was from sneezing, and the results have been assessed on the basis of relief from sneezing which was the presenting and the most annoying symptom. Treatment was effective in relieving rhinorrhoea in 73.9 per cent of cases, while headache and blockage of the nose were relieved in 72.2 per cent and 67.6 per cent of cases respectively.

Patients who had asthma in addition to allergic rhinitis were also of interest. Out of 12 such cases treated with 15 per cent silver nitrate, 50 per cent of patients had relief from asthma and allergic rhinitis, 33.3 per cent of cases had relief only from sneezing without any effect on the asthma, while two cases had no relief.

The only patients who experienced relief from asthma, had had nasal symptoms preceding bronchospasms. These results are statistically significant at minimum level, but in view of the difficulty in treating asthma, these results can be considered to be of some significance.

The period of follow-up has ranged from two to five years, and 21 out of 76 (27.6 per cent) patients who had a good or fair relief have so far continued to experience relief up to five years. Other patients had a recurrence after six months to five years but this was easily controlled by two or three further applications of 15 per cent silver nitrate. Four out of six (66.6 per cent) patients who had relief with earlier intranasal hydrocortisone injections, responded well to 15 per cent silver nitrate applications, whilst one patient had a fair relief.

In order to find out the most efficient strength, silver nitrate of different concentrations was applied in 34 cases (Table II). This was in addition to 74 patients treated with 15 per cent silver nitrate. In another five cases, only normal saline was applied after application of the local anaesthesia. Normal saline produced no effect, whilst 5 per cent silver nitrate had an effect for two to three days only. Ten per cent silver nitrate was effective in 30 per cent of cases. Fifteen per cent silver nitrate has given the best results. With 20 per cent and 25 per cent silver nitrate , success could be achieved, but there was irritation in the nose for many days after the application.

Complications

When silver nitrate was applied without local anaesthesia, patients experienced sneezing and rhinorrhoea for a few hours. This has been avoided or significantly

TABLE I

RESULTS OF SYMPTOMATIC RELIEF WITH 15% SILVER NITRATE IN 74 CASES

Symptoms	No. of cases	Good		Fair		Poor		
		No.	%	No.	%	No.	%	*P*-values
Sneezing	74	48	64.9	8	10.8	18	24.3	<0.001
Rhinorrhoea	69	41	59.4	10	14.5	18	26.1	<0.001
Blocking	37	19	51.4	6	16.2	12	32.4	<0.001
Headache	36	20	55.5	6	16.7	10	27.8	<0.001
Asthma	12	6	50.0	–	–	6	50.0	<0.01

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TABLE II

COMPARISON OF THE RESULTS FOR RELIEF FROM SNEEZING BY APPLICATIONS OF DIFFERENT CONCENTRATIONS OF SILVER NITRATE AND NORMAL SALINE

Treatment	No. of cases	Good		Fair		Poor		Comments	*P*-value
		No.	%	No.	%	No.	%		
Normal saline	5	–	–	–	–	5	100	Ineffective	>0.01
5 per cent silver nitrate	5	–	–	–	–	5	100	Relief for very short time	>0.01
10 per cent silver nitrate	10	2	20	1	10	7	70	Effective at times	>0.01
15 per cent silver nitrate	74	48	64.9	8	10.8	18	24.3	Good results	<0.001
20 per cent silver nitrate	10	5	50	3	30	2	20	Good but irritating	<0.001
25 per cent silver nitrate	9	6	66.7	3	33.3	–	–	Effective but severe irritation	<0.001

reduced by administering a tablet of antihistamine one hour before application and by initial application of topical anaesthesia. This is true for silver nitrate of 15 per cent strength or less, but with 20 per cent silver nitrate, irritation had been quite severe. With 25 per cent silver nitrate, irritation often lasted for many days.

One case had good relief from sneezing but experienced anosmia. A methaemoglobin level above 1 gm percentage was not detected in the blood of any patient, nor was pigmentation of gums observed. These are the possible side effects in silver nitrate poisoning (Blackow, 1972).

Discussion

Antihistamines render only temporary relief in allergic and vasomotor rhinitis, and the frequent occurrence of drowsiness often becomes more troublesome to the patient than the disease itself.

Zinc ionization and cryotherapy are useful mainly for nasal obstruction. They do not relieve sneezing and rhinorrhoea, and sophisticated equipment is required for therapy.

Bhargava *et al.* (1980) found local applications of 15 per cent silver nitrate to be simple and effective, and patients accepted the treatment readily. It could be applied in co-operative children and it was useful even in those patients who have been treated with corticosteroids locally or systemically. The applications were effective in four out of six patients who had no relief with previous intranasal hydrocortisone injections. Of five patients who had no benefit from silver nitrate applications, three responded well to hydrocortisone injections intranasally. Thus the two kinds of treatment can be complementary to each other for those patients, who do not experience relief with one or other mode of therapy.

Among the various concentrations of silver nitrate tried for local application (Table II), 15 per cent silver nitrate appears to be the most effective and acceptable. All the concentrations of silver nitrate of 15 per cent and more are capable of relieving the patient, but higher strengths have lower acceptability due to irritation after application.

Silver nitrate produces a local astringent action by coagulating albumin (David *et al.* 1956). This action seems to reduce the sensitivity and excitability of the mucous membrane. The anterior parts of the nasal septum and inferior turbinates appear to be the 'trigger zones' whose stimulation leads to sneezing and rhinorrhoea. Silver nitrate reduces the sensitivity and excitability of these 'trigger zones' and thus relief is obtained. Since some patients suffering from asthma have also been relieved, these areas are likely to be the 'trigger zones' for reflex bronchospasm, or asthma in these cases may result from spread of nasal allergy downwards into the tracheobronchial tree. Once the nasal allergy is controlled, spread to the lower respiratory tract may be prevented.

Conclusions

1. Treatment by local application of 15 per cent silver nitrate is easy, and yet effective in relieving symptoms.
2. Effect lasts for much longer time with 15 per cent silver nitrate compared to 5 per cent or 10 per cent silver nitrate.
3. Irritation following application of 15 per cent silver nitrate is negligible and easily controlled as compared to the irritation caused by 20 per cent and 25 per cent silver nitrate.
4. It can be easily repeated if symptoms recur.
5. Side-effects are negligible.
6. No sophisticated equipment or surgery is required.
7. Patients readily accept the treatment as they do not mind the application of a medicine in the nose.
8. It has a wide application, as the disease is very prevalent.
9. It is suitable for co-operative children.

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