Original Article

Significance of saline nasalirrigation for COVID-19 infection: observations and reflections from nursing care of nasopharyngeal carcinoma

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Background: Coronavirus disease 2019 (COVID-19) has placed a tremendous burden on the world's healthcare systems, prompting medical professionals worldwide to diligently research and experiment with treatment methods to prevent infection and alleviate symptoms. Previous studies have shown the potential of nasal irrigation in reducing viral clearance time and alleviating local symptoms of COVID-19. However, views differ regarding its efficacy in improving systemic symptoms. Thus, we sought to examine whether saline nasal irrigation might play a role in treatment and self-care after COVID-19 infection, but further validation is still necessary.

Methods: We conducted a retrospective analysis of 468 patients and 51 healthcare personnel concurrently. The participants were grouped based on whether they received saline nasal irrigation. We used χ^2 tests and Fisher's exact tests to assess the differences in the rates of COVID-19 infection and the rates of developing a fever after COVID-19 infection among different groups. Additionally, we used independent samples *t*-tests and Mann-Whitney U tests to evaluate differences in the maximum fever temperature and fever duration among participants with fever in different groups.

Results: The rate of developing a fever after COVID-19 infection was lower (37.7%) in the patients who underwent saline nasal irrigation. Among all febrile patients, there was no difference in the highest fever temperature, but patients who underwent saline nasal irrigation had a shorter fever duration (1.72±1.05 days). Additionally, the rate of COVID-19 infection and the rate of developing a fever were higher, and fever symptoms were more severe in the healthcare worker group than in the patient group.

Conclusions: Saline nasal irrigation can alleviate symptoms caused by COVID-19 infection.

Keywords: Coronavirus disease 2019 (COVID-19); saline nasal irrigation; nasopharyngeal carcinoma (NPC); radiotherapy (RT)

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Introduction

From the outbreak of coronavirus disease 2019 (COVID-19) in 2020 to December 5th, 2022, the cumulative number of global infections reached 646,512,341 and the number of deaths reached 6,642,707 (1). The pandemic placed a huge burden on the world's medical and healthcare systems, and medical professionals across the globe have been diligently researching and experimenting with treatment methods to reduce the possibility of infection and alleviate symptoms.

COVID-19 is spread through inhalation of aerosols that enter the mucous membranes (2). The nasal mucosa is the most critical site for viral activity (3). Previous research (4,5) has shown the effectiveness of nasal irrigation in ameliorating symptoms of diverse respiratory infections. Studies of upper respiratory tract infections have shown that nasal irrigation can ease symptoms such as nasal congestion and sore throat, reduce medication requirements, and expedite recuperation (4,5). Chalageri *et al.* noted the potential of nasal irrigation in reducing the time to viral clearance and alleviating local symptoms in COVID-19 (6). However, in terms of improving systemic symptoms, a recent study on the omicron variant of COVID-19 reported conflicting results (7). Thus, while nasal irrigation may have a role in treatment and self-care after COVID-19 infection, further research is required.

Nasopharyngeal carcinoma (NPC) is a malignant neoplasm of the head and neck region, commonly treated by radiotherapy (RT). Saline nasal irrigation is a common intervention during RT for NPC (8). It can remove secretions and necrotic substances from the nasal cavity, keeping it moist and hygienic. Additionally, it has been proven to reduce adverse reactions after RT, such as nasal adhesions and sinusitis, (9,10), improving the quality of life for NPC patients. It is performed during and after RT for NPC patients to prevent adverse reactions, such as nasopharyngeal ulcers. We conducted this study to explore the value of saline nasal irrigation in reducing the possibility of infection and alleviating symptoms in COVID-19 patients. We present this article in accordance with the STROBE reporting checklist (available at https://tcr.amegroups.com/article/view/10.21037/tcr-23-2384/rc).

Highlight box

Key findings

- Saline nasal irrigation alleviates symptoms after coronavirus disease 2019 (COVID-19) infection.

What is known, and what is new?

- Saline nasal irrigation can shorten the viral clearance time in COVID-19 patients. The effectiveness of nasal irrigation on COVID-19 systemic symptoms is debated.
- Pre-infection saline nasal irrigation lowers the risk of fever after COVID-19 infection. Nasal irrigation does not reduce peak fever but shortens fever duration after COVID-19 infection.

What is the implication, and what should change now?

- Saline nasal irrigation can be used for self-care after COVID-19 infection.

Methods

Participants

A total of 518 participants at Fujian Cancer Hospital from December 7, 2022, to January 7, 2023 were included in this study. The participants were divided into the following two groups: (I) the patient group, which comprised 468 patients with tumors; and (II) the healthcare group, which comprised 51 healthcare personnel. To be eligible for inclusion in the patient group, the patients had to meet the following inclusion criteria: (I) have biopsy-proven primary NPC or head and neck cancer (HNC); (II) have been receiving RT, chemotherapy, or follow-up examinations; and (III) have complete clinical information and laboratory data. Patients were excluded from the patient group if they met any of the following exclusion criteria: (I) had been undergoing ongoing immunotherapy or targeted therapy; (II) had concurrent uncontrolled nasal diseases that were not suitable for saline nasal irrigation; (III) had an active COVID-19 infection or a history of a past COVID-19 infection prior to the intervention; (IV) had concurrent uncontrolled severe primary tumor-related symptoms and severe adverse reactions to treatment; (V) had concurrent uncontrolled severe internal medical conditions; (VI) had other concurrent uncontrolled infectious diseases. The healthcare personnel were directly involved in daily clinical care during the same period. The tumor patients were further categorized into the following three groups based on their treatment and cancer type: (I) Group A (n=147), which comprised NPC patients treated with RT; (II) Group B (n=30), which comprised HNC patients treated with RT; and (III) Group C (n=291), which comprised NPC patients treated without RT. The healthcare personnel were designated as Group D (*Figure 1*). The study was approved by the Ethics Committee of the Fujian Cancer Hospital (No. K2023-207-01) and was conducted in accordance

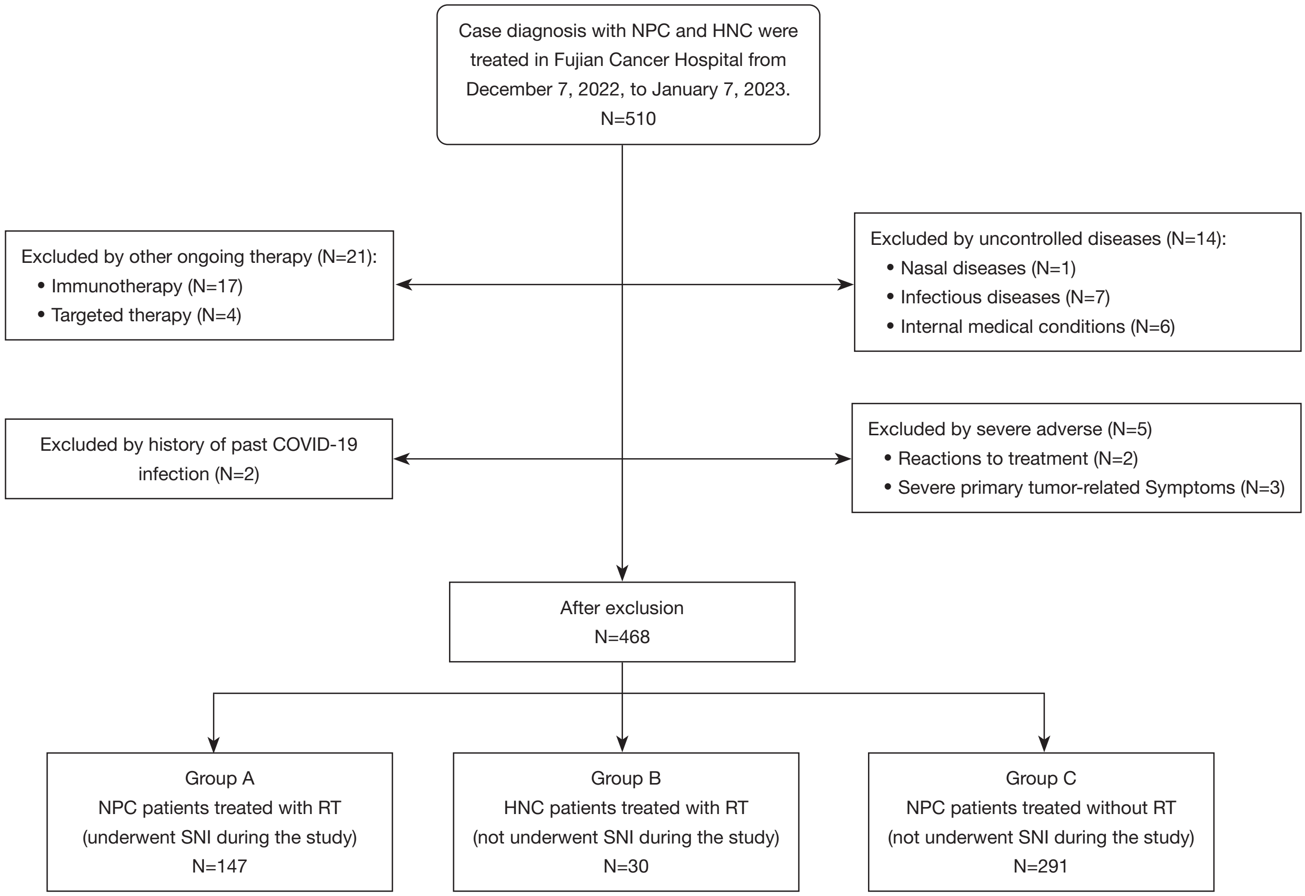

Figure 1 Flow chart for patient selection and grouping. NPC, nasopharyngeal carcinoma; HNC, head and neck cancer; COVID-19, coronavirus disease 2019; RT, radiotherapy; SNI, saline nasal irrigation.

with the Declaration of Helsinki (as revised in 2013). Informed consent was obtained from all participants prior to conducting the follow-up, and for those aged under 18 years, informed consent was obtained from their parents or legal guardians.

Intervention and outcomes

As part of the standard treatment for NPC and HNC, all the participants were required to abstain from smoking and drinking. All patients were hospitalized, patients in Group A and Group B underwent RT once daily from Monday to Friday. Infection with COVID-19 in participants was confirmed by reverse transcription-polymerase chain reaction (RT-PCR) test (nasopharyngeal swab). All patients underwent routine COVID-19 testing each admission and when developing symptoms. The healthcare personnel underwent COVID-19 testing daily during the study. The testing was conducted by Fujian Cancer Hospital's specialized sampling personnel. All the participants who were infected with COVID-19 during the study were required to temporarily suspend ongoing anti-tumor treatment and received the standard treatment for COVID-19. Conventional treatment included physical cooling and traditional Chinese medicine (TCM) prescriptions, which have been recommended by the Chinese National Health Commission to treat COVID-19 (11). As one of the adjuvant measures for NPC RT in Fujian Cancer Hospital all patients underwent RT for NPC were instructed by healthcare personnel on the correct nasal irrigation method before the RT. Specific procedures were as follows: the patients used self-provided nasal irrigation squeeze bottles with the head slightly tilted forward. Approximately 500ml of normal saline at about 37 ℃ was injected into the squeeze bottles. The output end of the squeeze bottles was inserted into the anterior nasal vestibule, closing the nostrils. Then, the squeeze bottles were gently and uniformly pressed. The patients were instructed to breathe through the mouth. Nasal irrigation was performed alternately on the left and right sides of the nasal cavities. Additionally, they underwent nasopharyngoscopy every 14 days to assess the nasal irrigation situation. Therefore, the participants in Group A underwent saline nasal irrigation twice daily, and continue nasal irrigation after infected with COVID-19. While the participants in the other groups were confirmed to have not undergone saline nasal irrigation during subsequent follow-ups. All the participants received daily axillary temperature measurements using a mercury thermometer, and a temperature exceeding 37.5 ℃ was considered a fever. Confirmed feverish participants underwent temperature measurements at least two times daily. Due to the Omicron variant infected and the pre-treatment assessment for anti-tumor therapy, all participants have not developed severe COVID-19 according to the "Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia (Trial Version 9)".

The main endpoints of the study were as follows: (I) the rate of COVID-19 infection in participants included in the study; (II) the rate of developing a fever after COVID-19 infection in participants included in the study; (III) the highest recorded body temperature during the fever in participants included in the study; and (IV) the duration of the fever in the feverish participants included in the study. Participants without complete outcome data and those lost to follow-up were not included in our study.

Statistical analysis

The categorical variables are described as frequencies (percentage), the normally distributed continuous variables are presented as the mean ± standard deviation, and the non-normally distributed continuous variables are presented as the median and the interquartile range. The χ^2 test and Fisher's exact test were used to compare differences in the categorical variables. The independent sample *t*-test was used to compare normally distributed continuous variables between groups, while the Mann-Whitney *U* test was used to compare the non-normally distributed continuous variables between groups. The statistical analysis was conducted using SPSS (version 26.0). A two-sided P value less than 0.05 was considered statistically significant. Given the possibility of type-I error, the study results should be interpreted as explorative and descriptive.

Results

Population characteristics

Four hundred and sixty-eight patients were included in the study. The average age of the patients was 52.12±11.74 years. The majority of the patients were male (73.1%). Among the patients, 147 (31.4%) underwent saline nasal irrigation. The patients in Group D were relatively younger than those in the other groups, and had an average age of 25.00±3.71 years, and were predominantly male (66.7%). There were no significant differences in gender distribution among the four groups. The age distribution was similar between Groups A (52.12±12.27 years) and C (51.39±11.25 years) ($P_{A vs. C}$ =0.385), but there were age differences among Groups A, B (59.17±11.87 years), and D ($P_{A vs. B}$ =0.008, $P_{A vs. D}$ <0.001) (*Table 1*). All participants had received at least two doses of the COVID-19 vaccine at the time of entering the study. In terms of pre-existing medical conditions, 10.5% patients had hypertension, 3.6% diabetes, 3.4% coronary heart diseases, 0.2% had chronic obstructive pulmonary disease (COPD). The vast majority were non-smokers (88.0%) and non-drinkers (91.9%). As can be seen in *Table 1*, there was no statistical difference among the Group A, Group B and Group C for numbers of vaccination or comorbidities. But the healthcare workers in Group D had a greater number of vaccine doses and fewer comorbidities (*Table 1*).

Infection rate and fever rate

Among the 468 patients, 379 (81.0%) were diagnosed with laboratory-confirmed COVID-19. All the healthcare workers in Group D were infected with COVID-19 during the study. The overall fever rate of the patients infected with the virus was 50.1%, while that of the healthcare group was 98.0%. The COVID-19 infection rate of Group A was lower (77.6%) compared to the other groups (Group B =86.7%, Group C =82.1%), but the difference did not reach statistical significance ($P_{A vs. B}$ =0.331, $P_{A vs. C}$ =0.253) (*Table 2*). The fever rate after infection in Group A was lower (37.7%) than those of Groups B and C (61.5% and 54.8%, respectively), and the difference was statistically significant ($P_{A vs. B}$ =0.03, $P_{A vs. C}$ =0.003) (*Table 2*).

Peak of fever

No notable differences in the highest fever temperatures recorded were observed among the Group A (38.32±0.78),

Table 1 Population characteristics

Characteristics	All patients (n=468)	Group A: NPC patients treated with RT (n=147)	Group B: HNC patients treated with RT (n=30)	Group C: NPC patients treated without RT (n=291)	Group D: healthcare staff (n=51)	P value		
						Group A *vs.* B	Group A *vs.* C	Group A *vs.* D
Age (years)	52.12±11.74	52.12±12.27	59.17±11.87	51.39±11.25	25.00±3.71	0.008	0.385	<0.001
Gender						0.947	0.190	0.718
Male	342 (73.1)	102 (69.4)	21 (70.0)	219 (75.3)	34 (66.7)			
Female	126 (26.9)	45 (30.6)	9 (30.0)	72 (24.7)	17 (33.3)			
Hypertension						0.770	0.334	0.029
No	419 (89.5)	129 (87.8)	26 (86.7)	264 (90.7)	50 (98.0)			
Yes	49 (10.5)	18 (12.2)	4 (13.3)	27 (9.3)	1 (2.0)			
Diabetes						>0.999	0.730	0.195
No	451 (96.4)	140 (95.2)	29 (96.7)	282 (96.9)	51 (100.0)			
Yes	17 (3.6)	7 (4.8)	1 (3.3)	9 (3.1)	0			
Coronary heart disease						>0.999	0.758	0.570
No	457 (97.6)	144 (98.0)	30 (100.0)	283 (97.3)	51 (100.0)			
Yes	11 (3.4)	3 (2.0)	0	8 (3.7)	0			
COPD						NA	>0.999	NA
No	467 (99.8)	147 (100.0)	30 (100.0)	290 (99.7)	51 (100.0)			
Yes	1 (0.2)	0	0	1 (0)	0			
Smoking status						0.760	0.888	0.007
No	412 (88.0)	130 (88.4)	26 (86.7)	256 (88.0)	51 (100.0)			
Yes	56 (12.0)	17 (11.6)	4 (13.3)	35 (12.0)	0			
Alcohol consumption						0.464	0.515	>0.999
No	430 (91.9)	137 (93.2)	27 (90.0)	266 (91.4)	48 (94.1)			
Yes	38 (8.1)	10 (6.8)	3 (10.0)	25 (8.6)	3 (5.9)			
Number of COVID-19 vaccines						0.169	>0.999	<0.001
2	466 (99.6)	147 (100.0)	29 (96.7)	290 (99.7)	0			
3	2 (0.4)	0	1 (3.3)	1 (0.3)	51 (100.0)			

Data are presented as mean ± standard deviation or n (%). NPC, nasopharyngeal carcinoma; RT, radiotherapy; HNC, head and neck cancer; COPD, chronic obstructive pulmonary disease; COVID-19, coronavirus disease 2019.

Table 2 Infection rate and fever rate

Characteristics	All patients (n=468)	Group A: NPC patients treated with RT (n=147)	Group B: HNC patients treated with RT (n=30)	Group C: NPC patients treated without RT (n=291)	Group D: healthcare staff (n=51)	P value		
						Group A *vs.* B	Group A *vs.* C	Group A *vs.* D
COVID-19 infection						0.331	0.253	<0.001
Positive	379 (81.0)	114 (77.6)	26 (86.7)	239 (82.1)	51 (100.0)			
Negative	89 (19.0)	33 (22.4)	4 (13.3)	52 (17.9)	0			
Fever						0.03	0.003	<0.001
F (+)	190 (50.1)	43 (37.7)	16 (61.5)	131 (54.8)	50 (98.0)			
NF (–)	189 (49.9)	71 (62.3)	10 (38.5)	108 (45.2)	1 (2.0)			

Data are presented as n (%). All patients, including 468 participants in groups A, B, and C diagnosed with nasopharyngeal carcinoma or head and neck cancer. The fever aspect was analyzed in only 379 cases of COVID-19-infected patients and 51 cases of COVID-19-infected healthcare workers. F: participants who have been infected with COVID-19 and developed a fever; NF: participants have been infected with COVID-19 but did not develop a fever; NPC, nasopharyngeal carcinoma; RT, radiotherapy; HNC, head and neck cancer; COVID-19, coronavirus disease 2019.

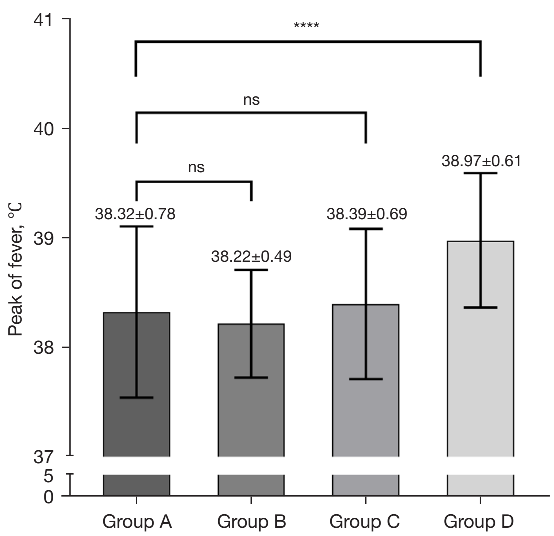

Figure 2 Bar chart of the highest post-infection fever temperatures in different groups. The fever aspect was analyzed in only 379 cases of COVID-19-infected patients and 51 cases of COVID-19-infected healthcare workers. Group A: NPC patients treated with RT (n=43); Group B: HNC patients treated with RT (n=16); Group C: NPC patients treated without RT (n=131); Group D: healthcare personnel (n=50). ****, P<0.0001. ns, not significant; COVID-19, coronavirus disease 2019 ; NPC, nasopharyngeal carcinoma; HNC, head and neck cancer; RT, radiotherapy.

Group B (38.22±0.49) and Group C (38.39±0.69) ($P_{A vs. B}$ =0.621, $P_{A vs. C}$ =0.552) (*Figure 2*). Nevertheless, the highest fever temperature recorded in Group A was considerably lower than that of the clinical physicians who were working during the same period in Group D (38.97±0.61), and this difference was statistically significant ($P_{A vs. D}$ <0.001) (*Figure 2*).

Duration of fever

The analysis of the duration of fever among the participants in different groups showed that individuals in Group A (1.72±1.05) had a significantly shorter duration of fever than those in Groups C (2.77±2.34) and D (3.13±1.38), and this difference was statistically significant ($P_{A vs. C}$ =0.008, $P_{A vs. D}$ <0.001) (*Figure 3*). However, there was no difference in the fever duration between Groups A and B (2.53±2.00) ($P_{A vs. B}$ =0.173) (*Figure 3*).

Discussion

Saline nasal irrigation has been proven to be effective for respiratory infections. Some studies have demonstrated that nasal irrigation reduces the time to viral clearance and alleviates local symptoms in COVID-19 (6,12,13). However, controversy continues as to its effectiveness in relieving systemic symptoms (7,14). NPC patients require saline

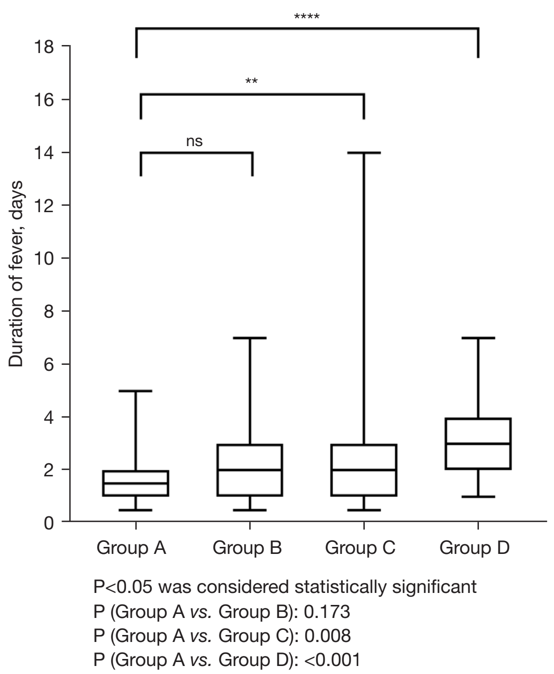

Figure 3 Box plot of the duration of post-infection fever in different groups. The fever aspect was analyzed in only 379 cases of COVID-19-infected patients and 51 cases of COVID-19-infected healthcare workers. Group A: NPC patients treated with RT (n=43); Group B: HNC patients treated with RT (n=16); Group C: NPC patients treated without RT (n=131); Group D: healthcare personnel (n=50). **, P<0.01; ****, P<0.0001. ns, not significant; COVID-19, coronavirus disease 2019 ; NPC, nasopharyngeal carcinoma; HNC, head and neck cancer; RT, radiotherapy.

nasal irrigation during radiation therapy. Thus, we sought to evaluate the significance of nasal irrigation in COVID-19 infection among nasopharyngeal cancer patients. The main symptoms of COVID-19 infection are fever, cough, muscle pain, and fatigue (15). For most people, symptomatic treatment is the main way to treat the illness. When a pandemic breaks out, patients face a shortage of medical resources, leaving them with limited options. However, simple and practical self-care measures are often the most viable and effective course of action.

In our study, we found that the COVID-19 infection rates did not differ between the patient group receiving saline nasal irrigation and the other patient groups. However, among all the febrile patients, the group that received nasal irrigation had a lower rate of developing a fever after COVID-19 infection. There were no differences in the maximum fever temperatures between the groups. Group A had a shorter fever duration than Group C but did not differ to Group B. Due to the age and disease type differences between patients in Groups A and B, we believe that various factors, including distinct immune functions, lifestyle habits, and potential disease risk factors, as well as the smaller sample size of Group B, may have contributed to these results. Further, we observed a higher rate of COVID-19 infection among clinical staff, as well as more severe fever symptoms following infection.

Based on these findings, nasal irrigation twice a day cannot prevent COVID-19 infection in NPC patients undergoing RT, it does play a practical role in mitigating the occurrence and duration of post-infection fever symptoms. Therefore, saline nasal irrigation serves as a simple and feasible self-care strategy for individuals after COVID-19 infection. Moreover, despite notable discrepancies in age distribution, disease conditions, and diverse lifestyle habits, clinical doctors encounter markedly higher infection rates and more severe fever symptoms than patients in our study. In our country, the predominant cases of COVID-19 infection are associated with the Omicron variant (16). Its strong transmission capability and tendency toward mild or asymptomatic presentation may made healthcare personnel more susceptible to infection in the work environment. This serves to emphasize the exacerbation of the scarcity of medical resources resulting from the far-reaching effects of the COVID-19 pandemic. There is an urgent need for treatments or nursing methods capable of effectively decreasing the disease course.

In our study, we discovered that nasal irrigation reduced the rate of developing a fever after a COVID-19 infection and shortened the duration of fever symptoms. Saline nasal irrigation may work through various following mechanisms. In patients infected with COVID-19, the upper respiratory tract of both asymptomatic and symptomatic individuals has been found to contain high levels of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (17), and there is clinical evidence supporting a correlation between the nasal viral load and disease severity (18). In contrast to the trend toward longer duration of viral shedding observed with antipyretics in rhinovirus infection, nasal irrigation has been shown to reduce viral load and shorten viral shedding both in common cold and in SARS-CoV-2 infection (19,20). Previous studies on the common cold have also demonstrated that saline irrigation can alleviate nasal symptoms and reduce viral shedding, which is important for relieving symptoms and decreasing viral transmission. Nasal saline irrigation can aid in the elimination of viruses by enhancing nasal cilia beating and mucociliary clearance (21,22), as well as by increasing nasal moisture and changing the properties of the nasal mucus to prevent mucus buildup, particularly during times of high fever, or when masks are being worn that cause dryness of the nasal mucosa (23-25). Nasal irrigation with saline solution has been shown to reduce the activity of inflammatory mediators (26) and inhibit the activity of furin, an enzyme that plays a crucial role in the proteolytic cleavage of the COVID-19 spike protein, through its interaction with the angiotensin-converting enzyme 2 receptor (27). Further, saline nasal irrigation has a direct antiviral effect, as it increases the concentration of chloride ions (28), promoting the conversion of available chloride ions to hypochlorous acid mediated by peroxidase in non-myeloid cells (29). This innate antiviral mechanism leads to broad-spectrum antiviral activity.

We postulate that saline nasal irrigation has the potential to improve symptoms in COVID-19 patients; however, there are still areas that require improvement. Research has indicated that saline solution can reduce the production of aerosols that transmit viruses through the air (30), resulting in more susceptible filtering by masks (31). SARS-CoV-2 can remain viable on plastic irrigation devices for up to 72 hours, and improper cleaning and disinfection measures may increase the spread of the virus (32), although fomite transmission has yet to be definitively documented. Thus, preventing the dissemination of the virus due to nasal irrigation devices necessitates our concerted efforts, and techniques, such as microwaving or boiling, may warrant consideration (33). Further, various types of nasal irrigation devices exhibit varying degrees of efficacy in irrigating the nasal cavity (34). For elderly patients, spray may be more practical compared to irrigation, as it could potentially reduce the risk of aspiration (35). The effectiveness of nasal irrigation is influenced by factors such as the position of the head during irrigation, the volume of irrigation, and any nasal surgery related to the nasal cavity (36). As such, further evidence is necessary to select suitable irrigation methods, and determine the frequency and duration of their use (37).

Additionally, there is ongoing debate as to the optimal concentration of saline solution for nasal irrigation. Isotonic and hypertonic saline nasal irrigations were considered safe and effective for relieving COVID-19 symptoms (13). However, a study suggest that hypertonic saline is more effective in inhibiting the replication of the COVID-19 virus (12). This was believed to be related to the effective stimulation of cellular membrane depolarization and intracellular energy deprivation mechanisms induced by hypertonic saline solution (38). Hypertonic saline has been found to have a stronger effect compared to normal saline on stimulating ciliary beat frequency, reducing inflammation, thinning mucus, and increasing hydration (39). A hypertonic solution can enhance direct antiviral activity through high chloride ion levels and regulate adenosine triphosphate use in ciliary axons to stimulate ciliary beat frequency (40). However, there are also potential drawbacks associated with hypertonic saline. A report has suggested that it can cause burning sensations and stimulate pain-sensitive nerves. Hypertonic saline may also trigger the release of histamine, increasing nasal reactivity and secretion, which can ultimately decrease nasal airway capacity (41). Previous research has shown that nasal irrigation solutions at temperatures between 20–40 ℃ is considered safe and effective (37). However, more research needs to be conducted to determine the correlation between the appropriate temperature and the efficacy of nasal irrigation (42). There have been investigations conducted on the usage of saline solution in conjunction with other drugs for treating COVID-19 (43,44). Further research needs to be conducted to determine the most effective concentration, temperature, instruments, and positioning of nasal irrigation for the benefit of patients.

In light of a global epidemic outbreak, individuals must take measures to safeguard themselves on multiple fronts. In situations in which resources are limited, it is advisable to employ uncomplicated and readily available methods of self-care. Nasopharyngeal irrigation is a practice that adheres to this principle and has the potential to reduce the likelihood of hospitalization, lower the probability of severe illness, and alleviate symptoms.

As a retrospective study formulated based on clinical findings, the inherent limitations of this study must be noted. First, this study was not a strictly controlled case study, and the data were solely collected from a single research center. Second, the lack of information on the vaccine product formulation is one of the shortcomings of this study. Nevertheless, based on our country's COVID-19 prevention and control policies, as well as the strategy for free vaccine administration, the vaccination status among groups can be assumed to be consistent. Third, our study did not include patients with severe COVID-19. This may make it overall more difficult to detect significant improvement of symptoms in clinical studies. Fourth, according to limitations in medical resources, we did not consider the correlation between the viral shedding time and symptoms. Meanwhile, there is limited research on the connection between NPC and COVID-19. Consequently, the findings of this study may not be universally applicable but should be treated as hypothesis generating. The study's significance lies in its ability to demonstrate its effectiveness under current circumstances.

Conclusions

Nasal irrigation can reduce the rate of developing a fever after COVID-19 infection and shorten the duration of fever symptoms. It can be used for self-care in respiratory infectious diseases similar to COVID-19.

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://tcr.amegroups.com/article/view/10.21037/tcr-23-2384/rc

Data Sharing Statement: Available at https://tcr.amegroups.com/article/view/10.21037/tcr-23-2384/dss

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was approved by the Ethics Committee of the Fujian Cancer Hospital (No. K2023-207-01) and was conducted in accordance with the Declaration of Helsinki (as revised in 2013). Informed consent was obtained from all participants prior to conducting the follow-up, and for those aged under 18 years, informed consent was obtained from their parents or legal guardians.

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