Clinical and Experimental Health Sciences

Determining the Effects of Nasopharyngeal Suction with Negative and Positive Pressure: Randomised Controlled Trial

Rukiye Kökkiz[1,2], Gülten Karahan Okuroğlu[3], Nuran Üstün[4]

[1] Fenerbahce University, Faculty of Health Science, Department of Nursing, İstanbul, Türkiye.
[2] Marmara University, Institute of Health Science, Department of Nursing, İstanbul, Türkiye.
[3] Marmara University, Faculty of Health Science, Department of Nursing, İstanbul, Türkiye.
[4] Istanbul Medeniyet University, Faculty of Medicine, Department of Child Health and Diseases, İstanbul, Türkiye.

Correspondence Author: Rukiye Kökkiz
E-mail: rukiye.kokkiz@fbu.edu.tr
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ABSTRACT

Objective: The study aims to determine the effects of nasopharyngeal suction with negative and positive pressure on pain level, respiratory parameters, and mucosal irritation in infants.

Methods: This study was conducted as a posttest randomized controlled experimental research. The data was collected at Göztepe Training and Research Hospital between January and November 2020. While the positive pressure suction method was applied to the experimental group, the negative pressure suction method was applied to the control group.

Results: It is determined that the pain level mean scores at the 1st and 5th minutes after the suction procedure are lower in the experimental group than in the control group (p=0.01). SpO2 values at the 1st, 5th, and 15th minutes after the procedure are significantly higher in the experimental group than in the control group (p=0.01). There is no statistically significant difference in the respiratory rate values between experimental and control groups (p>0.05).

Conclusion: It is determined that the post-procedure pain level is lower and the SpO2 value is higher in the experimental group (positive pressure suction) compared to the control group (negative pressure suction). Both methods do not cause mucosal irritation, as well.

Keywords: Infant, mucosal irritation, pain, respiratory parameters, suction

1. INTRODUCTION

Nurses are responsible for the suction function to clear the airway from secretions for effective breathing. Suction is defined as the removal of secretions from the respiratory system with a negative-pressure vacuum device (1, 2). In patients who are unable to extract respiratory secretions independently, suction is essential to maintain the oxygen demand and ventilation at the desired level and remove these secretions (1, 3).

The infant's respiratory and circulatory systems may be adversely affected as a result of the suction procedure, and several complications such as trauma, hemorrhage, and pain may develop. Suction is therefore one of the procedures that should be applied with caution in infants. Suction procedures for the respiratory tract in infants include oro/nasopharyngeal and endotracheal suction and suction methods include open and closed system suction methods (4, 5).

Oro/nasopharyngeal suction is a method that requires the use of negative pressure to remove secretions from the oropharynx, nasopharynx, or both (6, 7). When a foreign body penetrates the trachea from the pharynx, when respiratory secretions are too much, or when the secretion cannot be removed by normal cilia movement, coughing holds an important role. The inability to cough leads to atelectasis, pneumonia, and respiratory failure during infection of the respiratory tract. The cough reflex matures around the age of five in children. Adults can quickly remove existing airway secretions, but children with excessive airway

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secretions before this age are unable to do so easily. These secretions may be removed through either nasopharyngeal or oropharyngeal suction (8).

There are several risks and complications associated with the suction procedure. The most common ones are hypoxia, bradycardia, tachycardia, hypotension, hypertension, cardiac arrhythmia, cardiac arrest, atelectasis, bronchospasm, elevated intracranial pressure, nosocomial infection, tracheobronchial damage, and pain. Hypoxemia is the most prevalent and serious complication among them. To avoid suction-induced hypoxemia, different suction methods are being developed and novel devices are being employed (9, 10). Suction, a painful procedure, has been reported to negatively impact the physiological parameters, comfort, sleep, growth, and hospital stay of infants. The primary goal of pain management in infants is to minimize the pain experienced by infants due to various medical procedures and allow them to cope with the pain (11-13).

When the literature was examined, it was seen that signs and symptoms such as respiratory rate, heart rate, hypoxia, retractions (subcostal, intercostal, supracostal), nasal flaring, and irregular breathing were examined as respiratory parameters of newborns. (14).

Trauma is another complication of negative pressure suction. Suctioning of the tracheal, oral, and nasopharyngeal mucosa caused by negative pressure may result in hemorrhage and ulceration. As a result of the increased vacuum pressure generated during suction, the mucosal fragments are displaced from the catheter holes and absorbed (15,16).

When the literature was examined, no study was found regarding positive pressure aspiration in newborns. However, it is known that nasopharyngeal aspiration performed with negative pressure causes pain in babies and also causes negative consequences in physiological parameters such as heart rate, respiratory rate, oxygenation and hemodynamic stability (14, 17-19). Repetitive painful interventions can cause atrophy in the brain of babies and lead to neurodevelopmental problems. It also causes complications such as uncontrollable pain, changes in breathing and heart rates, and blood pressure. This can lead to infection, risk of infant death, and increased hospital stay (17).

It is important to reduce the complications seen in negative pressure aspiration, especially in groups that require special care, such as newborns. For this purpose, new methods and procedures are needed to prevent complications. This study aimed to examine the effects of positive pressure aspiration on newborns.

Objective

This study aimed to determine the effects of nasopharyngeal suction with the negative and the positive pressure on the level of pain, respiratory parameters, and mucosal irritation in infants.

Research Hypotheses

H1: The level of pain felt by infants during nasopharyngeal suction with positive pressure is lower than the level of pain they suffer during nasopharyngeal suction with negative pressure.

H2: In infants, nasopharyngeal aspiration with positive pressure has a positive effect on SpO_2 values and respiratory rates.

H3: In infants, the mucosal irritation caused by the nasopharyngeal suction with positive pressure is less than the mucosal irritation caused by the nasopharyngeal suction with negative pressure.

2. METHODS

2.1. Population and Sample

This study was designed as randomized, controlled, and experimental. The population was comprised of term infants who met the inclusion criteria, and were treated and cared for in the Neonatal Intensive Care Unit of a Training and Research Hospital in Istanbul, Turkey, between January 2020 and November 2020. The GPower 3.1 package program was used to calculate the sample size. It was determined that the effect size was 0.65, the type I error was 0.05, and the type II error was 0.8, and the research power was 0.80 (20). Accordingly, the sample size was calculated as 60 infants including 30 in the experimental group and 30 in the control group. The first 60 infants admitted to the neonatal intensive care unit who required nasopharyngeal suction were included in the sample and were randomly assigned to the experimental and control groups. The first hospitalized infant was assigned to the control group, and the second to the experimental group, and the assignment procedure was repeated in this order.

2.2. Implementation of the Study

The nasopharyngeal suction with negative pressure method was employed in the control group in this study. In this method, the nasal secretions were softened with 1-2 ml of physiological saline (PS), and then negative pressure suction was performed using a pine-tipped suction set. In the literature, neonatal aspiration pressure is defined as 60-100 mmHg. In this study, the suction pressure was kept between 60 and 80 mmHg, and no suction lasted for more than 15 seconds (21).

The nasopharyngeal suction with positive pressure method was employed in experimental group. In this method, the infant's head was turned to the side, to the nostril on the other side 1-2 ml of PS was injected with a syringe, and then positive pressure was exerted with the help of the end of the oxygen connection hose from the same nostril, with oxygen or air supply at 5-8 lt/min (if the baby requires oxygen, using an oxygen source) and the nasopharyngeal secretions were

removed from the nostril into which PS has been not injected. The oxygen connection hose was held one centimeter away from the infant's nostril. The researchers prepared a guideline for nasopharyngeal suction with positive pressure based on the literature (22).

In both groups, pain level, respiratory parameters (SpO_2 and respiratory rate), and mucosal irritation (the sign of hemorrhage in the nasal mucosa) were assessed.

The data were recorded in the data collection form created by the researcher. Following the collection of all data, the experimental and control groups were compared in terms of pain level, respiratory parameters, and mucosal irritation. This study was conducted by an NRP-(Newborn Resuscitation Program) certified researcher and the data were recorded by the same researcher.Since the data of the research was collected during the COVID-19 pandemic period, an independent observer could not be used to collect the data.

2.3. Inclusion And Exclusion Criteria

- Inclusion Criteria

- Babies who need suctioning (such as presence of nasal secretion, low SpO_2, wheezing, nose flap breathing, retractions; subcostal, intercostal or supracostal)

- Babies for whom consent can be obtained from their mother/father

- Exclusion Criteria

- Babies who are discharged during the study

- Babies who are intubated

- Infants with neurological and cranial disease were excluded.

2.4. Data Collection Tools

The researcher prepared a form to collect data. The data collection form includes four sections. The assessment periods were set according to the literature (8), and they were completed immediately before the aspiration process (aspiration process will be applied after measurement), 1st minute after the procedure, 5th minute after the procedure, and the 15th minute after the procedure.

- The first section had six questions on demographic data. In this section, data were collected regarding the diagnosis, week of birth, how old he/she was and gender.
- In the second section, the pain level is assessed with the Wong-Baker FACES Pain Rating Scale. There is no attempt to prevent pain during the aspiration process in the unit.
- The third section questioned data on respiratory parameters. The oxygen saturation value (Sp02) and respiratory rate were used to assess respiratory parameters. Since all babies were monitored with a monitor, the Sp02 value was taken from the monitors. Respiratory rate was determined by the researcher performing the aspiration.
- The fourth section evaluated the mucosal irritation as "present" or "absent" by inspecting the hemorrhage development in the nasopharyngeal mucosa. The presence of mucosal irritation was assessed by observation. The presence of mucosal damage was evaluated before the procedure, in 1st minute after the procedure, in 5th minute after the procedure, and the 15th minute after the procedure. It was evaluated as 'present' or 'absent' in terms of the presence of bleeding.

2.5. Ethical Considerations

The ethical approval institution is the Ethics Committee of Göztepe Training and Research Hospital. The approval number is 2020/0072.

The parents of the infants included in the sample gave their consent. It was planned to continue negative pressure suction in infants where nasopharyngeal secretions could not be removed with positive pressure, however, this was not required throughout the study.

The Clinical Trial number was taken as NCT06020638.

2.6. Limitations

The COVID-19 pandemic broke out during the data collection phase of the study. Due to the pandemic, we conducted the study with minimum human resources to reduce the risk of transmission in the neonatal intensive care unit. This inhibited an independent observer from collecting data. The lack of an independent observer is a significant limitation of the study. Due to the pandemic, the length of stay of infants in the neonatal intensive care unit was kept at a minimum level, hence the follow-up interval for mucosal irritation was set to be one day in this study.

2.7. Data Analysis

The data were recorded and analyzed on a computer using SPSS (Statistical Package for Social Sciences) for Windows 22. In the analysis of the data, first the requirements that needed to be met were tested to decide which tests (parametric/ non-parametric tests) to apply. To decide the normality of the distribution, kurtosis and skewness values and histogram graph, which are other events of Kolmogorov-Smirnov, Shapiro-Wilk normal events, were used. Summary values of quantitative (numerical) variables are presented as median (Q1-Q3), and summary values of qualitative (categorical) variables are distributions with frequency and percentage. Man Whitney-U test was used to compare two independent groups, Friedman test was used to compare more than two groups, and Bonferroni corrected pairwise comparisons were used to examine the difference. Chi square test was used to cover categorical variables. In interpreting whether the obtained values were significant or not, 0.05 was used as significance level measurements.

3. RESULTS

When the diagnoses of the babies are examined, it is seen that in the control group, 50% are temporary tachypnea of the newborn, 16.7% are sepsis, 6.7% are asphyxia, 13.3% are vomiting and 13.3% are other diseases. In the experimental group, 46.7% were diagnosed with temporary tachypnea of the newborn, 16.7% with sepsis, 13.3% with asphyxia, 3.3% with vomiting and 20% with other diseases. It was determined that there was no statistically significant difference between the experimental and control groups according to the gestational age (p> .05) and gender, which was considered to affect the study results (p> .05) (Table 1).

Table 1. *Demographic characteristics of the infants*

	Control Group (Negative Pressure Suction) n=30	Experimental Group (Positive Pressure Suction) n=30	Test Statistics	*p*
	Median (*P1-P3)**	**Median (***P1-P3)**		
Gestational Age	40.50 (38.00 – 42.25)	39.00 (37.75 – 41.00)	*Z*=-1.05	*.29
	***n* / %**	***n* / %**		
Female	15 / 48.4	16 / 51.6	X^2=.06	**.79
Male	15 / 51.7	14 / 48.3	X^2=.06	**.79
**Mann Whitney-U Test was run. ** Chi-Square Test was run p<.05 ***P1-P3: Percentile*				

3.1. Pain Level

The pain level mean scores in the 1st minute immediately after the procedure indicate a statistically significant difference in the experimental and control groups (p< .05). The mean scores of pain level at the 5th minute after the procedure indicated a statistically significant difference in the experimental and control groups (p< .05). When the median values were analyzed, it was found that the mean scores of pain level measured in the control group (Median=1) were higher than those in the experimental group (Median=0.33) The mean scores of pain level at the 15th minute after the procedure indicated no statistically significant difference in the experimental and control groups (p> .05) (Table 2).

3.2. Sp02 Values and Respiratuar Rates

A statistically significant difference was found between the SpO2 values that were measured over time in the control group (p< .05) (Table 3). A statistically significant difference was found between the SpO2 values that were measured over time in the experimental group (p< .05). As a result of the Bonferroni-corrected paired comparisons, it was found that the SpO2 values before the procedure were significantly lower than the SpO2 values measured at the 1st minute after the procedure, at the 5th minute after the procedure, and at the 15th minute after the procedure (p< .05) (Table 3).

Table 2. *Findings related to intragroup and intergroup comparison of pain level mean scores*

	Control Group (Negative Pressure Suction) *n*=30	Experimental Group (Positive Pressure Suction) *n*=30	Test Value	*p*
Pain Level After the Procedure	**Median (***P1-P3)**	**Median (***P1-P3)**		
1st minute[a]	5.67(5.33-6.33)	4.33(3.67-4.67)	*Z*=-4.39	**.01
5th minute[b]	1.00(0.67-1.33)	0.33(0.00-0.33)	*Z*=-4.91	**.01
15th minute[c]	0.00(0.00-0.00)	0.00(0.00-0.00)	*Z*=-1.00	*.32
Test Value	X^2=59.05	X^2=55.86		
P	****.01**	****.01**		
Difference	c<a b. b<a	b c<a		
**Mann Whitney-U Test was run. **Friedman Test was run. p<.05 ***P1-P3: Percentile*				

When the findings on the intergroup comparison of the differences between the repeated Spo2 values were examined (Table 3), it was found that the difference between the SpO2 values before the procedure and at the 1st minute after the procedure is higher in the control group than in the experimental group (p< .05), the difference between the SpO2 values at the 1st minute after the procedure and 5th minute after the procedure is higher in the control group than in the experimental group (p< .05), and the difference between SpO2 values at the 5th minute after the procedure and the 15th minute after the procedure is higher in the control group than in the experimental group (p< .05) (Table 3).

A statistically significant difference was found between respiratory rates that were measured over time in the control group (p< .05). As a result of the Bonferroni-corrected paired comparisons made to determine at what time intervals the difference occurred, it was found that the respiratory rate at the 15th minute after the procedure was significantly lower than the respiratory rate values measured before the procedure, at the 1st minute after the procedure and the 5th minute after the procedure. Moreover, the respiratory rate in the 1st minute after the procedure was significantly lower than that before the procedure (p< .05) (Table 3). A statistically significant difference was found between the respiratory rates that were measured over time in the experimental group (p< .05). As a result of the Bonferroni-corrected paired comparisons, it was found that the respiratory rates at the 5th and 15th minutes after the procedure were significantly lower than the respiratory rates measured before the procedure and at the 1st minute after the procedure (p< .05) (Table 3).

When the respiratory rates of the experimental and control groups were compared, it was found that there was no statistically significant difference between the experimental and control groups in terms of the respiratory rates measured before the procedure (p> .05), at the 1st minute after the procedure (p> .05), and the 5th minute after the procedure (p> .05) and 15th minute after the procedure (p> .05) (Table 3).

Table 3. *Findings related to intra-group and inter-group comparison in terms of spo2 and respiratory rate*

Findings	Control Group (Negative Pressure Suction) *n*=30	Experiment Group (Positive Pressure Suction) *n*=30	Test Value	*p*
SpO_2 values	Median (***P1-P3*)	Median (***P1-P3*)		
Before the procedure[(a)]	95.67 (95.33-96.67)	95.83 (94.67-97.08)	*Z*=-0.17	*.86
1st Minute[(b)] after the procedure	92.33 (91.58-93.17)	99.33 (99.25-99.67)	*Z*=-6.03	**.01
5th Minute[(c)] after the procedure	96.00 (95.33-97.00)	98.67 (97.00-99.00)	*Z*=-4.59	**.01
15th Minute[(d)] after the procedure	97.00 (96.00-97.33)	98.33 (97.58-98.67)	*Z*=-4.04	**.01
Test Value	X^2=63.04	X^2=68.64		
p	**.01	**.01		
Difference	b<acd. a<dc. c<d	a<bcd		
Comparison of differences				
Before the procedure[(a)] – 1st Minute[(b)] after the procedure	3.50 (2.66; 4.00)	-3.33 (-4.08; – 2.33)	-6.240	**0.000**
1st Minute[(b)] after the procedure-5th Minute[(c)] after the procedure	-3.66 (-4.33; – 3.00)	1.00 (0.33; – 1.33)	-5.838	**0.000**
5th Minute[(c)] after the procedure-15th Minute[(d)] after the procedure	-0.66 (-1.30; – 0.33)	0.00 (-0.33; 0.33)	-4.149	**0.000**
Respiratory Rates				
Before the procedure[(a)]	51.33(49.33-53.33)	51.00(47.83-53.33)	*Z*=-0.75	*.45
1st Minute[(b)] after the procedure	54.67(51.17-56.00)	53.33(49.83-56.67)	*Z*=-0.68	*.50
5th Minute[(c)] after the procedure	51.33(47.33-52.67)	50.33(45.83-52.17)	*Z*=-0.81	*.42
15th Minute[(d)] after the procedure	50.67(47.33-52.00)	50.00(45.33-52.00)	*Z*=-0.59	*.56
Test Value	X^2=74.22	X^2=69.86		
P	**.01	**.01		
Difference	d<abc. a<b	cd<ab		
*Mann Whitney-U Test was run. **Friedman Test was run. p<.05 ***P1-P3: Percentile				

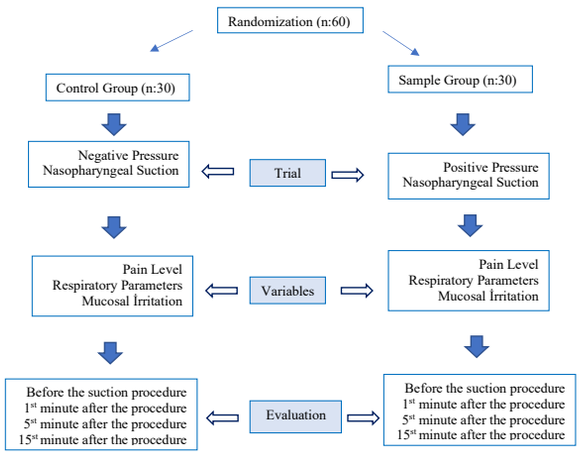

Figure 1. *Flow Chart of the Study*

3.3. Mucosal Irritation

No hemorrhage was observed in the nasal mucosa during the procedure in both groups.

4. DISCUSSION

4.1. Pain Level

Patients suffer pain during the suction procedure and suction is a painful procedure that causes changes in physiological parameters, especially in infants (22,17). The pain suffered by infants in the control group who underwent negative pressure suction alleviated significantly only at the 15th minute after the procedure. On the other hand, the pain levels at the 5th and 15th minute after the procedure were significantly lower than the pain levels immediately after the procedure in infants who underwent positive pressure suction in the experimental group. When these findings were evaluated, it is possible to conclude that the severity of pain decreased within a shorter time in infants who underwent the positive pressure suction procedure.

It was determined that there was a statistically significant difference between the experimental and control groups in terms of the mean score of the pain levels recorded at 1st and 5th minute after the procedure, and the mean score of the pain levels of infants in the control group is significantly higher than the mean score of the pain levels of infants in the experimental group (p< .05). This finding indicated that positive pressure suction caused less pain in infants compared to negative pressure suction. When the mean scores of the pain level measured at the 15th minute after the procedure were analyzed, no statistically significant difference was found between the experimental and control groups (p> .05).

When the literature was reviewed, no study was found that compared the effects of positive pressure nasopharyngeal suction and negative pressure nasopharyngeal suction on pain in infants. It is known, however, that nasopharyngeal suction

causes pain in infants as well as physiological consequences, such as a fluctuation in heart rate, respiratory rate, blood pressure, or a decrease in oxygenation and hemodynamic stability (17, 18). On the other hand, it was underlined that pain caused cognitive impacts in infants proportional to the severity and length of the pain and the severity and length of the pain may affect the infant's future response to pain (17, 18, 23). Positive effects of positive pressure suction on the severity and length of pain were observed in this study when compared to negative pressure suction. Given the impact of pain that may occur during nasopharyngeal suction on the physiological effects and cognitive development of infants, as well as their response to pain throughout their lives, it is believed that it is important to prefer positive pressure nasopharyngeal suction.

4.2. SpO2 Values and Respiratuar Rates

A statistically significant difference was found between the SpO2 values measured over time in the control group ($p< .05$); it is found that the SpO2 values measured at the 1st minute after the procedure were significantly lower than the SpO2 values measured at the 5th and 15th minutes after the procedure, while the SpO2 values measured at the 5th minute after the procedure were significantly lower than the values at the 15th minute after the procedure (Table 3). These findings suggested that negative pressure nasopharyngeal suction lowered the SpO2 value in infants, but the SpO2 value began to rise after the fifth minute. Likewise, a statistically significant difference was found between the SpO2 values measured over time in the experimental group ($p< .05$). However, this difference is found to be in favor of the SpO2 values before the procedure, and there is no significant difference between the SpO2 values measured at the 1st minute after the procedure, the 5th minute after the procedure, and the 15th minute after the procedure (Table 3). These findings indicated that positive pressure suction not only does not lower SpO2 values but increases them by having a positive effect when compared to values before the procedure, hence reducing the risk of hypoxic complications.

When the literature was reviewed, no study was found that compared the positive pressure nasopharyngeal suction and negative pressure nasopharyngeal suction in infants. However, several studies examining the effects of oro/nasopharyngeal suction in infants soon after delivery reported that the SpO2 value was lower in the group with suction was lower than in the group without suction (13, 14). These results suggested that nasopharyngeal suction may lower oxygen saturation in infants. In this study, positive-pressure nasopharyngeal suction had a higher positive effect on oxygen saturation than negative-pressure nasopharyngeal suction, which is considered a significant finding in terms of infant comfort.

A statistically significant difference is found between respiratory rates measured over time in the control group ($p< .05$) (Table 3). Negative pressure suction increased respiratory rate immediately after the procedure but returned to the values before the procedure in the 5th minute after the procedure. Likewise, a statistically significant difference is found between the respiratory rates measured over time in the experimental group ($p< .05$) (Table 3). Positive pressure nasopharyngeal suction increased respiratory rate immediately after the procedure in infants but returned to the values before the procedure at the 5th minute after the procedure, similar to the control group. Invasive treatments have been reported in the literature to raise the respiratory rates of infants (6). When the time-dependent changes in the respiratory rate of the experimental and control groups measured after the procedure were examined, the findings seemed to be compatible with the literature (6). The effects of positive and negative pressure suction methods on respiratory rate were similar in nasopharyngeal suction procedures in infants, and the effect of elevation in respiratory rate immediately after the procedure lasted for a short time in both methods and returned to the values before the procedure at 5th minute after the procedure. When the literature was reviewed, no study was found that compared the effects of positive pressure suction and negative pressure suction on respiratory rates in infants. This finding is found to be significant in terms of contributing to the literature in this regard.

4.3. Mucosal Irritation

No sign of hemorrhage was found in the nasal mucosa observation at the 1st minute after the procedure, at the 5th minute after the procedure, and at the 15th minute after the procedure in the experimental and control groups. It is known that suction of the tracheal, oral, and nasopharyngeal mucosa caused by negative pressure suction may result in hemorrhage and ulceration (16). Unlike the literature, this study revealed no hemorrhage in the nasal mucosa in the repeated observations after the procedure in the infants in the negative pressure suction group. It is believed that suitable practices made by the researcher during the negative pressure suction such as the insertion of a catheter of proper thickness, as well as the adjusting proper pressure by the researcher during the negative pressure suction, may have ensured that the suction did not irritate in the nasal mucosa. Positive pressure suction, on the other hand, did not cause nasal mucosa hemorrhage in infants. This finding was significant for the comfort of the infant after nasopharyngeal suction.

5. CONCLUSION

These findings indicated that the pain level was lower and the SpO2 value was higher in infants who underwent the positive pressure suction, compared to the negative pressure suction method. The effects of both methods on respiratory rate are similar, and in both methods, any mucosal irritation is not detected throughout the observation.

It is recommended that the positive pressure suction method be preferred for nasopharyngeal suction in infants, neonatal

nurses be trained on the effectiveness of the positive pressure suction method, and studies with larger samples and longer follow-up periods be done.

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Appendix

Application Directive Of Nasopharyngeal Aspiration With Positive Pressure

1.0 Purpose: To ensure adequate ventilation of the lungs by removing secretions and foreign materials from the upper respiratory tract as soon as possible.

2.0 Application:

2-1 Hands are washed according to protocol.

2-2 Aspiration is done in accordance with aseptic technique.

2-3 The aspiration process should not be continued for more than 10-15 seconds.

2-4 Appropriate position is given to the newborn (head is turned sideways).

2-5 During aspiration, the balloon mask system should be kept ready with the newborn.

2-6 The positive pressure to be used for aspiration should be 5-8 lt/min.

2-7 During aspiration, the baby's skin color and vital signs are monitored on the monitor.

2-8 Necessary materials for aspiration should be available with the newborn.

2-9 Aspiration should be done before feeding.

3.0 Conditions Requiring Aspiration

3-1 Wheezing

3-2 Cough

3-3 Presence of secretions

3-4 Presence of foreign substances (milk, food) in the nasopharyngeal region

4.0 Conditions to be Considered in Aspiration Application

4-1 Aspiration should be done when necessary.

4-2 To be more effective, lung physiotherapy should be performed in accordance with the protocol before aspiration.

4-3 Aspiration should be done before feeding.

5.0 Materials

5-1 Positive pressure source (02 – air)

5-2 Glove

5-3 Balloon-mask system

5-4 physiological saline

5-5 Injector

6.0 Pre-Operation Preparation

6-1 The materials are prepared and brought to the patient.

6-2 Positive pressure source is controlled

6-3 The general condition of the baby is evaluated

6-4 Hands are washed according to protocol

6-5 Gloves are worn

6-6 Appropriate position for the baby

7.0 Processing

7-1 In order to soften the secretions, 1-2 milliliters of SF is given to the nostril using an injector.

7-2 Immediately after the administration of SF, positive pressure is given with the end of the oxygen hose through the same nostril.

7-3 The same procedure is applied to both nostrils.

8.0 Post-Processing

8-1 The newborn is followed up for vital signs

8-2 Materials are collected

8-3 Hands are washed according to protocol

8-4 The transaction is recorded

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