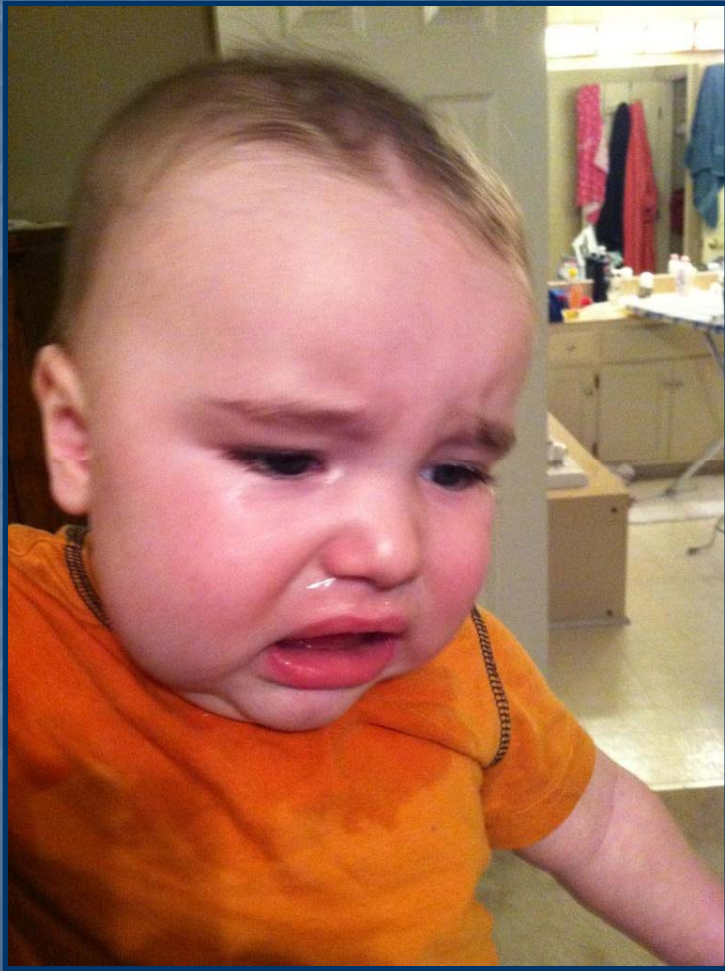


The Effect of Saline Use in Nasal Suctioning of Infants



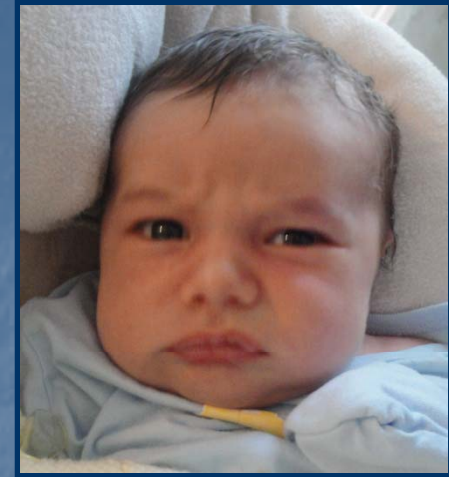
Research conducted at
Salem Hospital
Pediatric Unit

Oregon Nursing Research and Quality
Consortium
April 23, 2012

Katrina E. Davis MS, RN, CPNP, CNS

Background

- Nasal suctioning is a standard practice in the care of infants with upper respiratory infections which produce mucous
- Saline is historically used to help clear mucous during nasal suctioning in hospitals and is recommended for home use
- No research is available to show that saline use helps clear mucous



INSTILLING NORMAL SALINE WITH SUCTIONING: BENEFICIAL TECHNIQUE OR POTENTIALLY HARMFUL SACRED COW?

By Margo A. Halm, RN, PhD, CNS-BC, and Kathryn Krisko-Hagel, RN, MS

Normal saline has been widely used in acute care settings during endotracheal and tracheostomy suctioning. Clinicians have held fast to this longstanding tradition because many were taught that normal saline breaks up secretions and aids in their removal (especially tenacious secretions). In this clinical review, we summarize current evidence related to the following questions: Does instilling normal saline during suctioning increase sputum yield? Alternatively, is this practice associated with

care units (ICUs). In addition to these studies, a guideline on tracheal suctioning from the Joanna Briggs Institute¹⁵ was retrieved.

Sputum Recovery

Sputum volume or weight was measured in 5 of the 14 studies (36%).¹⁻⁵ In 3 of those 5 studies (60%), instillation of normal saline was associated with significantly increased retrieval of sputum. The difference in sputum volume ranged from 1 to 2 g, which may not be of clinical importance. In another

Study Question

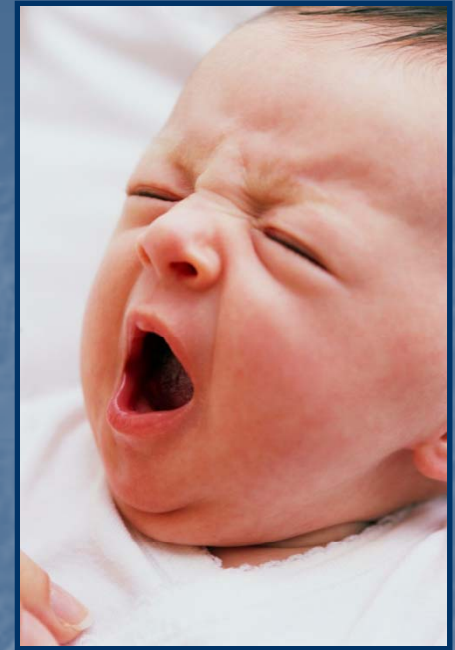
- This study was designed to measure the clinical effects of not using saline, or using one of two methods of saline installation during nasal suctioning



“In infants 6 months of age and under who are hospitalized with a respiratory diagnosis, does distress or other clinical outcome differ according to nasal suctioning methods with or without the instillation of saline?”

Hypotheses

1. Nasal suctioning, regardless of method or use of saline, will cause temporary increased infant distress, but improved clinical outcome.
2. Compared to nasal suctioning without saline, suctioning with saline will cause more distress, but improved outcome.
3. There will be no difference in infant distress or clinical outcome between the two suctioning methods using saline.



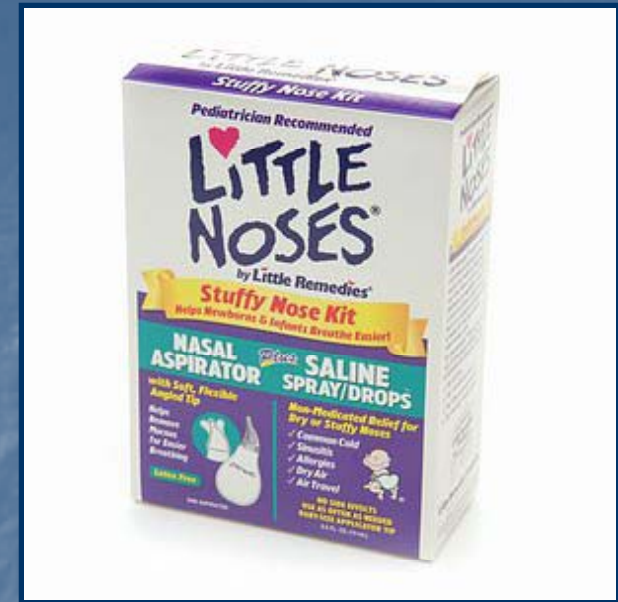
Study Methods

- Staff Training & Agreement
- Sample & Subject Recruitment
 - Infants 6 months and younger
 - Admitted to Pediatric Unit with respiratory illness (bronchiolitis, pneumonia, asthma)
 - Randomly assigned into one of three groups per computer generated list
- Information for Parents
 - Informed and could decline, no signed consent



Groups

- **A - No Saline**
 - N = 22
- **B – Saline Wash**
 - N = 18
- **C – Saline Drops**
 - N = 22



Outcome Measures

- Clinical Outcomes
 - Length of Stay (LOS)
 - Heart rate (HR)
 - Clinical Respiratory Score (CRS)
 - Oxygen Saturation (O₂ Sat)
 - Fluids (IV or oral)
- Measure of Comfort
 - Neonatal Infant Pain Score (NIPS)



Data Collection



- Data Collectors
 - Four experienced staff
 - Inter-rater reliability tested on scales
 - Blinded to Group assignment
- Data Collection
 - Immediately before and within 5 minutes after suctioning
 - Minimum 4 hours between episodes of data collection

Results



Demographics

	N	Min	Max	Mean
Age (weeks)	57	1	30	13.4
LOS (days)	53	.57	5.76	2.26

Gender

- Female = 25
- Male = 32



Demographics



Diagnosis	Frequency	%
Bronchiolitis/RSV	42	73.7%
Pneumonia	3	5.3%
Asthma	1	1.75%
Above combined	1	1.75%
Other (cough, fever, influenza, apnea)	10	17.5%
Total	57	100%

Descriptives



	N	Minimum	Maximum	Mean
B-HR	145	103	206	159.6
P-HR	145	97	210	159.4
B-O2 Sat	145	83	100	95.9
P-O2 Sat	143	91	100	96.9
B-NIPS	145	0	7	1.14
P-NIPS	145	0	7	.66
B-CRS	145	0	6	2.30
P-CRS	145	0	5	1.77



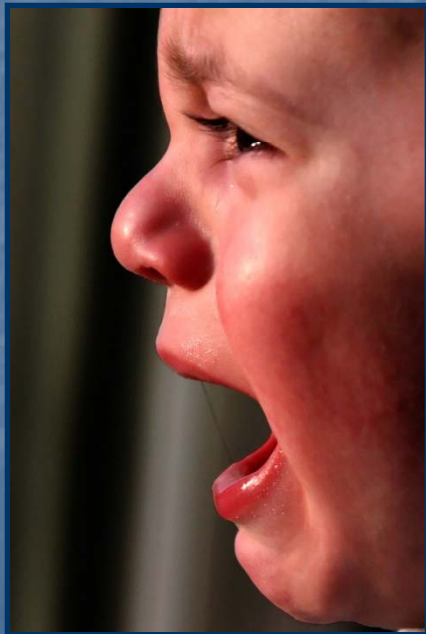
Descriptives

	Frequency	Percent
B-FiO2-Supp	47	32.2%
P-FiO2-Supp	47	32.2%
B-IV Fluids	33	22.6%
P-IV Fluids	32	21.9%
B-Comfort	63	43.1%
P-Comfort	86	58.9%

Results

- **Hypothesis 1**: Nasal suctioning, regardless of method or use of saline, will cause temporary increased infant distress but improved clinical outcome.

All paired variables are significantly correlated with each other ($p < .05$)



	N	Correlation	Sig.
Pair 1 BHR & PHR	145	.578	.000
Pair 2 BNIPS & PNIPS	145	.353	.000
Pair 3 BCRS & PCRS	143	.409	.000
Pair 4 BO2Sat & PO2Sat	145	.650	.000

Results

- Hypothesis 1: Nasal suctioning, regardless of method or use of saline, will cause temporary increased infant distress but improved clinical outcome.



NIPS, O₂ Sat and CRS show significant changes

	t	Sig. (2-tailed)
Pair 1 BHR & PHR	145	.859
Pair 2 BNIPS & PNIPS	145	.01
Pair 3 BCRS & PCRS	143	.01
Pair 4 BO ₂ Sat & PO ₂ Sat	145	.01

➔ **Nasal Suctioning increases infant distress but improves clinical outcome**

Results

- **Hypothesis 2**: Compared to nasal suctioning without saline, suctioning with saline will cause more distress, but improved clinical outcome

- All t-test comparisons of data before and after saline use are non-significant ($p > .05$)



Difference (Equal variance assumed)	t-test for equality of means	
	t	Sig. (2-tailed)
HR	.037	.970
O2Sat	.207	.836
CRS	-1.443	.151
NIPS	-1.051	.259

➔ Nasal suctioning with saline showed no difference from suctioning without saline for infant distress or clinical outcome

Results

- Hypothesis 3: There will be no difference in infant distress or clinical outcome between two methods of suctioning with saline

Difference	t-test for equality of means	
	t	Sig. (2-tailed)
HR (Equal Variances assumed)	-1.009	.316
O2Sat (Equal Variances assumed)	-1.000	.320
CRS (Equal variances assumed)	-.025	.980
NIPS (Equal variances not assumed)	2.272	.03
LOS (Equal variances assumed)	.289	.774

Only NIPS showed a difference between methods of suctioning with saline ($p < .05$)



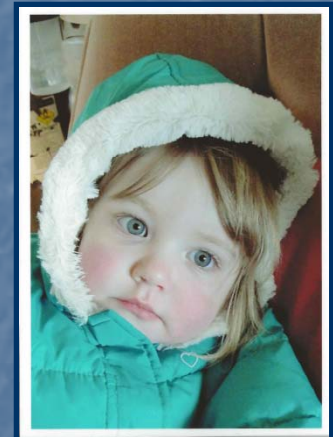
➔ A difference was shown in infant distress but not clinical outcome between the two methods of suctioning with saline

Results

- **Hypothesis 3**: There will be no difference in infant distress or clinical outcome between two methods of suctioning with saline

		N	Min	Max	Mean
Group B (Wash)	B-NIPS	42	0	7	1.50
	P-NIPS	42	0	7	.43
	NIPS Diff	42	-7	7	1.07
Group C (Drops)	B-NIPS	37	0	7	.54
	P-NIPS	37	0	6	.38
	NIPS Diff	37	-2	6	.16

Group C had less change in pain score from before to post suctioning so experienced more pain than Group B



➔ Suctioning with saline using a wash resulted in less infant distress than using drops but there was no difference in clinical outcome

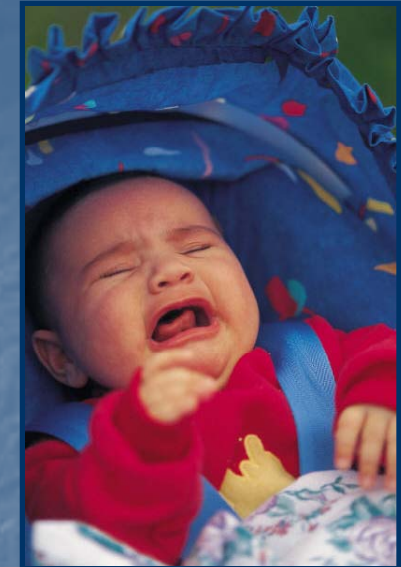
Results

- Overall Null Hypothesis

ANOVA

Difference	F	Sig.
HR	.535	.587
O2Sat	.487	.615
CRS	1.035	.358
NIPS	2.557	.081

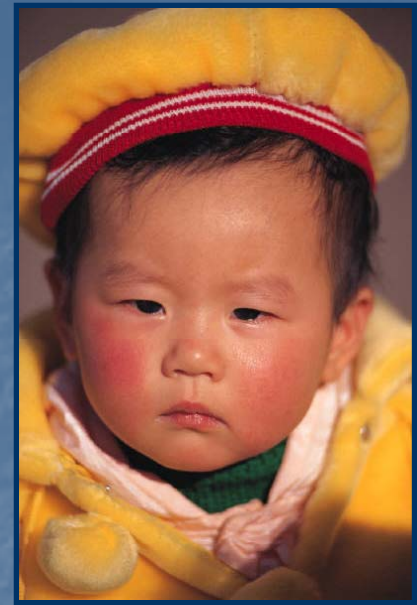
There was no difference between the 3 methods of suctioning for
HR
O2Sat
CRS
NIPS (approaching significance)



➔ No difference was shown in infant distress or clinical outcome among the three methods of suctioning

Application to Practice

- Nasal Suctioning helps infants' clinical outcome
- Adding saline to nasal suctioning does not help clinical outcome, but does not cause harm
- Using saline drops during nasal suctioning may cause more infant distress than using a saline wash



Challenges

- Time to reach sample size - 2 bronchiolitis/RSV seasons
- Patients excluded after enrollment

Number enrolled = 84, Final N = 57 Reasons for exclusion:

- Never needed suctioning (13)
- Parent refused (5)
- Wrong suctioning method used (4)
- Wrong diagnosis (2)
- MD ordered another method (2)
- Not assigned randomly into group (1)

- Data Collection challenges

- Data collectors not available when suctioning needed
- Staff forgot to ask for data collector



Limitations

- **Sample size**

- Would larger sample in each group make a difference?

- **Outcome Measures**

- Did our tools hit the target?
- Delay in pain measurement appropriate?
- Could we have included infant feeding ability?





Questions?

Research Team

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Thank you!

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