USE OF BODY POSITION TO SELECTIVELY SUCTION THE 
LEFT MAIN STEM BRONCHUS 

by 
Sally Ann Santmyer 

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STATEMENT BY AUTHOR

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SIGNED:  

APPROVAL BY THESIS DIRECTOR

This thesis has been approved on the date shown below:

GAYLE A. TRAVER
Associate Professor of Nursing
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ABSTRACT

Suctioning is an accepted procedure utilized to remove secretions from the tracheobronchial tree in patients with a tracheal tube (tracheostomy or endotracheal) in place or for those patients unable to clear their own secretions. Since it is more difficult to catheterize the left main stem bronchus with a suction catheter than it is to catheterize the right main stem bronchus, suctioning is less effective in clearing secretions from the left main stem bronchus than from the right main stem bronchus. This study was concerned with the use of the left lateral body position to facilitate selective catheterization of the left main stem bronchus.

Twelve subjects were studied using a control procedure, where the patient was supine with his head turned to the right, and an experimental procedure, where the patient's body was turned to the left with the head turned to the right. The position of the radiopaque suction catheter was identified on a routine chest film. Turning the body to the left did not facilitate selective catheterization of the left main stem bronchus. The left main stem bronchus was not selectively catheterized when the patient was supine with his head turned to the right.
CHAPTER I

INTRODUCTION

Tracheal suctioning is a simple but important therapeutic procedure which is widely used in the nursing care of patients with impaired airway clearance. Patients who have tracheal tubes in place require suctioning for the elimination of secretions and for maintenance of an unobstructed airway. Patients who are unable to effectively cough or clear their own secretions also require nasotracheal suctioning.

Much time has been spent in developing procedures for suctioning and in developing suction catheters that are increasingly less traumatic. It has been recognized, however, that the ability to remove secretions from the left main stem bronchus is much less effective that the ability to remove secretions from the right main stem bronchus. The apparent inability to selectively direct a suction catheter into the left main stem bronchus is an issue of importance in patients with secretion-related respiratory problems. The present investigation is concerned with the effective use of body position in conjunction with tracheal catheterization in order to selectively catheterize the left main stem bronchus.
Statement of the Problem

Can turning the body to the left with rotation of the head to the right facilitate entry of a suction catheter into the left main stem bronchus of a patient with a tracheal tube in place?

Significance of the Problem

Suctioning of both bronchi is an important aspect of respiratory care for upon its effectiveness may rest the success of the various modalities utilized during the management of respiratory failure. The anatomy of the tracheobronchial tree favors catheterization of the right main stem bronchus. A lack of consensus exists in the literature regarding an effective method to be employed in guiding a catheter to the desired main stem bronchus. Recent experimentally designed studies have indicated that methods currently taught and utilized are not effective in achieving selective catheterization of the left main stem bronchus (Opie and Smith, 1959; Kirmili, King, and Pfaeffle, 1970; Haberman et al., 1973). A method that will facilitate entry into the left main stem bronchus would allow removal of secretions from both lungs. This type of treatment should allow a more thorough cleansing of the tracheobronchial tree which will aid in the maintenance of an unobstructed airway and will promote equal and effective ventilation. A primary function of those administering
nursing care is to maintain a patent airway, thus facilitating oxygenation which is necessary to maintain life. A method allowing selective catheterization of the left main stem bronchus would improve the effectiveness of airway care in patients requiring tracheobronchial suctioning.

Kirmili et al. (1970) believe that the ineffectiveness of suction techniques currently in use could partially account for post-operative atelectasis and unexplained fevers (possibly from pneumonitis) seen in patients experiencing difficulty in clearing secretions. Thus, a method which increases the frequency of selective catheterization of the left main stem bronchus could potentially improve the clinical course of patients suffering from bronchial secretion-related respiratory problems.

**Hypotheses to be Tested**

1. The left main stem bronchus will be catheterized at a significantly greater frequency when the patient is in the left lateral position with his head turned to the right than when the patient is in the supine position with the head turned to the right.

2. The right main stem bronchus will be catheterized at a significantly greater frequency than the left when the patient is in the supine position with the head turned to the right.
Theoretical Framework

The anatomy of the tracheobronchial tree contributes to the fact that the right main stem bronchus is entered more frequently by a suction catheter than is the left bronchus. Because the angle of bifurcation of the left main bronchus is sharp, catheter entry is often difficult. The right bronchus enters the right lung opposite the fifth thoracic vertebra. It is greater in diameter than the left bronchus and leaves the trachea at an angle of 25 degrees from the vertical. The left bronchus is narrower and longer than the right. It enters the left lung opposite the sixth thoracic vertebra and branches off from the trachea at approximately 45 degrees from the vertical. The carina of the trachea is located to the left of the midline of the trachea. The right bronchus appears as a more direct continuation of the trachea than the left (Gray, 1965).

Because of the anatomical asymmetry of the tracheobronchial tree and because the right bronchus is larger in diameter than the left, foreign bodies, such as a suction catheter, entering the trachea have a tendency to enter the right bronchus rather than the left. Turning the entire body of the patient to the left may aid in directing the catheter to the preselected left bronchus through the use of gravitational forces, as based on Newton's Law of Universal Gravitation. Newton's law states, "every object in the universe attracts every other object with a force directly
proportional to the product of their masses and inversely proportional to the square of the distance between them" (Millikan, Gale, and Edwards, 1928, p. 20).

The focus of the present investigation is catherization of the left main stem bronchus. It is postulated that use of gravitational forces (turning the patient's body to the left) will overcome the natural tendency of a suction catheter to enter the right main stem bronchus.
CHAPTER II

REVIEW OF THE LITERATURE

A summary of the literature pertinent to currently used positioning procedures for selective catheterization of the main stem bronchi and use of curved tip catheters will be presented.

It has been generally taught that manipulation of the head position and of the catheter itself will facilitate selective entry of the right or left main stem bronchus (Wade, 1973; Egan, 1969; Petty, 1972; Bryan and Taylor, 1973). It is stated that the head should be turned away from the bronchus to which entry is intended; the head is turned to the left to enter the right main stem bronchus or turned to the right to enter the left main stem bronchus. Some authors of nursing texts recommend elevation of the chin and turning the chest in the direction of the bronchus to be entered in addition to positioning the the head in one direction or another (Secor, 1969; Bushnell, 1973). To aspirate secretions from the left main stem bronchus, the patient's head is turned to the right, the chin is elevated, and the chest is turned to the left. To suction the right main stem bronchus, the patient's head is turned to the
left, the chin is elevated, and the chest is turned to the right before the catheter is introduced into the trachea.

Although the traditional method to enter the left main stem bronchus is to turn the head to the right, available data refute that manipulation of head position is an effective technique for selectively aspirating the left main stem bronchus. Opie and Smith (1959) in an investigation of 15 tracheotomized patients found that rotation of the head to the right failed to guide the catheter into the left main bronchus in six of seven patients. Kirmili et al. (1970) have shown in a study of 12 surgical patients with intra-tracheal tubes in place that the head turning procedure does not increase entry into the left main stem bronchus. In their investigation, they found that the catheter entered the right side in most patients regardless of the position of the patient's head. Kirmili et al. (1970, p. 344) concluded, "The practice of teaching various head positions to facilitate guidance of the catheter to the left bronchus should be discontinued."

Haberman et al. (1973) completed a study of 24 patients having endotracheal or tracheostomy tubes in place using a scintigraphic technique to determine the suction catheter location. They found that positioning of the head and shoulder had limited effect on entry into a preselected bronchus. Successful cannulation of the left main stem bronchus using a straight tipped catheter with head and
shoulder positioning to the right occurred in 38 of 104 attempts or 37 per cent.

In addition to the above techniques, use of curved tip catheters has been advocated (Wade, 1973). The curved tip of the catheter is rotated toward the bronchus in which entry is intended. Haberman et al. (1973) found that use of a curved tip catheter only increased selective catheterization of the left main stem bronchus from 37 per cent (with straight catheter) to 53 per cent. Kirmili et al. (1970) concluded that a curved tip catheter will enter the right side more often than the left, although it could be guided to the left bronchus more often than a straight catheter. Use of a curved tip catheter may enhance the chance of catheterizing the left main stem bronchus, but the catheter's rigidity and sharp angle are more traumatizing to the mucous membrane than the straight catheter (Bushnell, 1973; Opie and Smith, 1959).

Fuhs, Rieser, and Brisbon (1972) recommended turning the tracheotomy tube to facilitate entry into the left main stem bronchus. The cuff on the tracheostomy tube is deflated and the tube is rotated to the left to direct catheterization of the left bronchus. There were no scientific data presented to support the efficacy of this procedure. In addition, movement of the tracheal tube has been shown to increase tracheal mucosal damage (Harley, 1971).
Opie and Smith (1959) also investigated turning of the body to the preselected side to assist the catheter's entry by gravity. Their investigation indicated that in seven patients where the chest was in the left lateral position at an angle of 60 to 90 degrees before the catheter was introduced, the right bronchus was entered in all cases. The study was limited to tracheotomized patients. The use of head positioning in conjunction with body position was not reported, nor was the position of the patient's torso (flat or elevated). Turning the head to the right may have different effects in the tracheotomized patient as opposed to the patient who has a endotracheal tube in place. Due to the limitations of Opie and Smith's (1959) study, body positioning as a means of selective cannulization should not be abandoned without further study.
CHAPTER III

METHODOLOGY

In this chapter the research design, sample selection, and methods for analyzing the data are presented.

Research Design

To study the question of the effect of body positioning in facilitating selective catheterization of the left main stem bronchus, an experimental design, whereby each subject underwent the experimental and control condition, was utilized. Since each subject was to undergo both conditions and serve as his own control, variables such as anatomic differences could be controlled. If a subject did not undergo both conditions the data for the sample condition were retained.

Data were collected by identifying the position of a radiopaque catheter on a chest roentgenogram. Patients receiving care for respiratory-related problems are normally scheduled for portable chest roentgenograms in order to aid in the continuous assessment of their clinical situation. By conducting the procedure of the present study during the pre-scheduled chest films, the investigator was afforded a means of collecting data by radiographic determination of catheter position without exposing the patient to additional
discomfort or risk. The department of nursing, primary attending physicians, and radiologists at the medical center were familiar with the research proposal prior to its initiation.

In the present investigation, turning the head to the right in order to facilitate catheterization of the left main stem bronchus was determined to be the standard treatment and patients in the control group were suctioned utilizing the head turning procedure. Patients in the experimental group were turned to their left side with their head turned to the right before introduction of the catheter into the trachea.

Sample

All subjects in the sample population met the following criteria:

1. were 16 years or older;
2. had a tracheal tube in place;
3. had no known anatomical abnormalities of the trachea or main stem bronchi;
4. could be positioned on their left sides and could be placed in the supine position in bed with the head elevated at 45 degrees;
5. met the above criteria and were scheduled for a portable chest film; and
6. consented to participate in the study by their personal signature or the signature of the legal guardian on the Human Subjects Consent Form.

Method of Data Collection
The design of the present study was developed so that each patient served as his own control. The intent was to collect data for each subject under both control and experimental conditions on two different occasions determined by the physician's orders for chest roentgenograms. If data were not collected under both conditions for a subject, the data were not excluded. Appropriate methods of statistical analysis were determined to analyze the population consisting of all subjects and the population consisting of those subjects who served as their own control. The order of assignment to the initial procedure, experimental or control, was determined by a table of random numbers.

Prior to both the experimental and control procedure, the following preparation was done by the investigator. The subject was placed in a Semi-Fowler's position with the head of the bed elevated to approximately 45 degrees. The subject was then suctioned through a three-way swivel adapter, using the routine procedure of tracheobronchial aspiration. The initial suctioning was performed in order to clear the larger airways of secretions. The
subject was then hyperoxygenated with high oxygen flows for three to four breaths either by a mechanical ventilator or manually by the investigator utilizing a self-inflating bag.

For the control procedure, an X-ray plate was placed behind the subject's back in the desired position for a chest roentgenogram. With the head of the bed elevated at a 45 degree angle, the subject's head was turned to the right and an Aero-Flo® Tip suction catheter was inserted through the suction port of the swivel adapter. There was no suction applied to the catheter. The subject continued to be ventilated through the ventilation port of the adapter. The catheter was then taped to the subject's cheek while the chest roentgenogram was taken. Following the chest film, the catheter was removed, the patient was hyperoxygenated, and routine care was resumed.

For the experimental condition, the same preparation was performed as was done for the control position. The head of the bed was then elevated to a 45 degree angle, and the subject's body was turned to the left at approximately a 90 degree angle to the bed. The subject's head was turned to the right and the radiopaque catheter was inserted and taped in the same manner as was followed for the subjects in the control condition. The subject was then returned to the Semi-Fowler's position with the chest X-ray plate behind his back in the desired location. Following
the chest film, the catheter was removed, the subject was hyperoxygenated, and routine care was resumed.

The location of the catheter was identified by a radiologist reading the chest film. When reading the film, the radiologist had no prior knowledge as to which procedure, experimental or control, had been performed. The location of the catheter was recorded to correlate with the subject's number and positioning method used.

**Analysis of the Data**

The research hypotheses were tested to determine the significance of the data collected. The McNemar test for the significance of change in the case of two related samples, the Fisher exact probability test, and the Binominal test were the tests of statistical analysis used.
CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The purpose of this chapter is to present the characteristics of the sample, and to present and analyze the data.

Characteristics of the Sample

The sample was selected from intubated patients in the medical and surgical intensive care units of a southwestern university hospital. Twelve adults, five females and seven males, who met the criteria of the study established in Chapter III, were studied. Eight subjects were in the surgical intensive care unit and four were in the medical intensive care unit.

The subjects' sex and age are presented in Table 1. The subjects ranged in age from 21 to 75 years, with a mean age of 59 years. Whether or not mechanical ventilation was in operation at the time of study and the size and type of endotracheal tube are also presented in Table 1. Mechanical ventilation was in operation at the time of study on all subjects except subject 1. Subjects 3, 5, and 8 had nasotracheal tubes with sizes ranging from seven to eight millimeters internal diameter. The remaining subjects had orotracheal tubes with sizes varying from seven to eight
Table 1. Subject's Sex, Age, Mechanical Ventilation in Operation, and Size and Type of Tube

<table>
<thead>
<tr>
<th>Subject Number</th>
<th>Sex</th>
<th>Age</th>
<th>Mechanical Ventilation in Operation</th>
<th>Size and Type of Tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>51</td>
<td>No</td>
<td>#8 orotracheal</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>75</td>
<td>Yes</td>
<td>#8 orotracheal</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>68</td>
<td>Yes</td>
<td>#7 nasotracheal</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>59</td>
<td>Yes</td>
<td>#8 orotracheal</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>59</td>
<td>Yes</td>
<td>#7 nasotracheal</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>53</td>
<td>Yes</td>
<td>#8 orotracheal</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>68</td>
<td>Yes</td>
<td>#8 orotracheal</td>
</tr>
<tr>
<td>8</td>
<td>M</td>
<td>68</td>
<td>Yes</td>
<td>#8 nasotracheal</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>64</td>
<td>Yes</td>
<td>#8 orotracheal</td>
</tr>
<tr>
<td>10</td>
<td>M</td>
<td>52</td>
<td>Yes</td>
<td>#7 orotracheal</td>
</tr>
<tr>
<td>11</td>
<td>M</td>
<td>67</td>
<td>Yes</td>
<td>#8 orotracheal</td>
</tr>
<tr>
<td>12</td>
<td>M</td>
<td>21</td>
<td>Yes</td>
<td>#7 orotracheal</td>
</tr>
</tbody>
</table>
millimeters internal diameter. No subject had a tracheostomy tube. The tubes were in place from one to seven days at the time data were collected.

Presentation of the Data

The individual results of the catheterizations of the 12 subjects are presented in Table 2. For the control condition, the subject was in the supine position with the head turned to the right. For the experimental condition, the subject's body was turned on his left side at a 90 degree angle to the bed with his head turned to the right. In both conditions, the head of the bed was elevated at a 45 degree angle.

The chest roentgenogram showed the catheter to be in the right main stem bronchus, regardless of procedure, in subjects 2, 3, 4, 8, 10, and 11. In no subject was the catheter shown to be in the left main stem bronchus for both the control and experimental procedures.

In subject 6, the catheter entered the left main stem bronchus in the control procedure. With the experimental procedure, the catheter entered the right main stem bronchus.

In subject 9, the catheter entered the right main stem bronchus in the control procedure. In the experimental procedure, the catheter entered the left main stem bronchus.
Table 2. Location of Catheter after Insertion Using Control and Experimental Conditions for all Subjects

<table>
<thead>
<tr>
<th>Subject Number</th>
<th>Control</th>
<th>Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Right</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Right</td>
<td>Right</td>
</tr>
<tr>
<td>3</td>
<td>Right</td>
<td>Right</td>
</tr>
<tr>
<td>4</td>
<td>Right</td>
<td>Right</td>
</tr>
<tr>
<td>5</td>
<td>Right</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Left</td>
<td>Right</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Right</td>
</tr>
<tr>
<td>8</td>
<td>Right</td>
<td>Right</td>
</tr>
<tr>
<td>9</td>
<td>Right</td>
<td>Left</td>
</tr>
<tr>
<td>10</td>
<td>Right</td>
<td>Right</td>
</tr>
<tr>
<td>11</td>
<td>Right</td>
<td>Right</td>
</tr>
<tr>
<td>12</td>
<td>Left</td>
<td></td>
</tr>
</tbody>
</table>
Data were only obtained in one procedure for four subjects. Subjects 1, 5, and 12 were catheterized in the experimental position but not the control. Subjects 1, 5, and 12 were extubated before the second procedure could be carried out. Subject 7 died before the second procedure.

In the total sample the right main stem bronchus was catheterized in nine of 11 attempts (82%) with the control condition, and eight of nine attempts (88%) with the experimental condition (Table 3). In the eight subjects who served as their own control, the right main stem bronchus was catheterized in seven of eight attempts (88%) with the control condition, and seven of eight attempts (88%) with the experimental condition (Table 4).

In the total sample the left main stem bronchus was catheterized in two of 11 attempts (18%) in the control position and in one of nine attempts (11%) in the experimental position (Table 3). In the group who served as their own control, the left main stem bronchus was catheterized in one of eight attempts (12%) with the control condition and in one of eight attempts (12%) with the experimental condition (Table 4).

Analysis of the Data

The research hypotheses were tested in two populations. The first population consisted of the 12 subjects comprising the total sample. The second population
Table 3. Frequency of Left and Right Main Stem Bronchus Catheterization for all Subjects for Control and Experimental Conditions

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Experimental</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Main Stem Bronchus</td>
<td>9 (82%)</td>
<td>8 (88%)</td>
<td>17 (85%)</td>
</tr>
<tr>
<td>Left Main Stem Bronchus</td>
<td>2 (18%)</td>
<td>1 (12%)</td>
<td>3 (15%)</td>
</tr>
<tr>
<td>Total</td>
<td>11 (100%)</td>
<td>9 (100%)</td>
<td>20 (100%)</td>
</tr>
</tbody>
</table>

Table 4. Frequency of Left and Right Main Stem Bronchus Catheterization in the Eight Subjects who Served as Their Own Control for Control and Experimental Conditions

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Experimental</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Main Stem Bronchus</td>
<td>7 (88%)</td>
<td>7 (88%)</td>
<td>14 (88%)</td>
</tr>
<tr>
<td>Left Main Stem Bronchus</td>
<td>1 (12%)</td>
<td>1 (12%)</td>
<td>2 (12%)</td>
</tr>
<tr>
<td>Total</td>
<td>8 (100%)</td>
<td>8 (100%)</td>
<td>16 (100%)</td>
</tr>
</tbody>
</table>
consisted of the eight subjects who had both procedures and served as their own control.

The hypothesis that turning the patient to the left side with the head turned to the right would allow a greater frequency of left main stem bronchus catheterization was rejected. The raw data for all patients were submitted to the Fisher exact probability test (Siegel, 1956). In two of 11 attempts with the control position, the left main stem bronchus was catheterized (Table 5). The left main stem bronchus was catheterized in one of nine attempts with the experimental condition. The data were not significant at the .05 level. The experimental procedure was no more effective in catheterizing the left main stem bronchus than the control procedure.

Table 5. Frequency of Catheterization of the Left Main Stem Bronchus in the Control Position for all Subjects

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Experimental</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>3</td>
</tr>
</tbody>
</table>

Fisher Exact Probability Test \( p = .3 \).
The raw data for the eight subjects who served as their own control were submitted to the McNemar test for the significance of change in the case of two related samples. The data were not significant at the .05 level (Table 6). The hypothesis that turning the patient's body to the left with the head turned to the right would allow selective catheterization of the left main stem bronchus was rejected for the subjects who served as their own control as well as for all subjects. The experimental procedure was no more effective in catheterizing the left main stem bronchus than the control procedure.

Table 6. Frequency of Change from Catheterization of the Right Main Stem Bronchus in the Control Position to Catheterization of the Left Main Stem Bronchus in the Experimental Position

<table>
<thead>
<tr>
<th></th>
<th>No (-)</th>
<th>Yes (+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes (+)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>No (-)</td>
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McNemar Test for the Significance of Change $p = .5$. 
The hypothesis that turning the patient's head to the right would give a greater frequency of catheterization of the right main stem bronchus was accepted in the total group. The raw data from the control condition for the total population were submitted to the Binomial test (Siegel, 1956). Nine of 11 attempts resulted in catheterization of the right main stem bronchus which was significant at the .05 level ($p = .03$).
CHAPTER V

CONCLUSIONS OF THE STUDY

In this chapter a discussion of the findings is presented including the conclusions of the study, the implications for nursing, and recommendations for future study.

Discussion of the Findings

The hypothesis that the left main stem bronchus would be catheterized at a significantly greater frequency when the patient was in the left lateral position with his head turned to the right than when the patient was in the supine position with the head turned to the right was rejected. Turning the entire body to the left with the utilization of gravitational forces did not facilitate selective catheterization of the left main stem bronchus. The findings in the present study are similar to those found by Opie and Smith in 1959. In their study of seven patients with tracheostomies who were turned to the left side prior to catheterization, Opie and Smith consistently failed to selectively enter the left main stem bronchus. One explanation for the failure of body position to facilitate catheter entrance into the left main stem
bronchus could be that the catheter was not heavy enough to effectively use gravitational forces.

The hypothesis that the right main stem bronchus will be catheterized at a significantly greater frequency when the patient is in the supine position with the head turned to the right was accepted. The findings of the present investigation are similar to those found by Opie and Smith in 1959, Kirmili et al. in 1970, and Haberman et al. in 1973. Opie and Smith (1959) found that with the patient in the supine position and his head turned to the right, the catheter entered the right main stem bronchus in six of seven attempts. In Kirmili et al.'s (1970) study the right main stem bronchus was catheterized in 11 of 12 attempts when the patient was supine with the head turned to the right. Finally, Haberman et al. (1973) related that positioning of the head to the right with the left shoulder down produced catheterization of the right main stem bronchus 69 per cent of all attempts with the left being catheterized only 29 per cent.

Implications for Nursing

Use of body position does not facilitate selective catheterization of the left main stem bronchus. In addition, the present study, and the studies of Opie and Smith (1959), Kirmili et al. (1970), and Haberman et al. (1973) have demonstrated that turning the head to the right does
not facilitate selective entry of the suction catheter into the left main stem bronchus. Thus, the individual who is carrying out a suctioning procedure through a tracheal tube cannot predictably direct the catheter into the left main stem bronchus. In providing bronchial hygiene to patients with secretion-related problems, particularly those with secretions localized in the left lung area, the ability of nursing personnel to adequately clear secretions with a suction catheter from both main stem bronchi remains an issue.

In order to effectively clear the airways of secretions and thereby maintain a patent airway, nursing personnel should utilize alternative means to aid the suctioning procedure in the removal of secretions from the tracheobronchial tree. Measures suggested to aid the removal of secretions include maintenance of adequate hydration, delivery of adequate humidity to the airways, postural drainage with percussion and vibration, stimulation of the patient's cough reflex, providing frequent and regular deep breaths, administration of mucolytic agents and bronchodilators, and instillation of saline through the tracheal tube. In order to maintain a patent airway and thereby enable adequate oxygenation, nursing personnel must be aware of clinical and radiographic findings which suggest a secretion-related problem in the patient subject to respiratory disorder. Suctioning procedures should not be
considered to guarantee optimal airway care. The nurse should use adjunctive measures to suctioning to remove secretions from the tracheobronchial tree.

**Recommendations for Future Study**

Use of the curved-tip catheter has increased selective catheterization of a predetermined main stem bronchus. Opie and Smith (1959) catheterized the left main stem bronchus in six of seven attempts in patients who were lying in the supine position while utilizing the curved-tip catheter. Kirmili et al. (1970) catheterized the left main stem bronchus in five of 12 attempts utilizing the angle-tip catheter while the patient's head was turned to the right. Haberman et al. (1973) selectively catheterized the left main stem bronchus in 88 per cent of all attempts utilizing the coudé catheter with the head turned to the right. A future study is recommended to determine the effectiveness of the coudé catheter in facilitating selective catheterization of the left main stem bronchus in conjunction with turning the body to the left with the head turned to the right.

Catheterization of the left main stem bronchus is less effective than catheterization of the right main stem bronchus when currently utilized suction procedures are employed. However, there is little scientific evidence in the literature that documents a greater occurrence of left
sided secretion related problems. A recommendation for future study is the investigation of the occurrence of left sided secretion problems in patients with tracheal tubes (tracheostomy or endotracheal) in place or in those patients unable to clear their own secretions.

The direction toward which the tracheal tube is pointed may affect the direction that the suction catheter takes. With the currently available tracheal tubes, it is nearly impossible to determine the direction in which the tracheal tube is pointed. Specially marked tracheal tubes may facilitate accurate visualization of the direction toward which the tip is pointed. A recommendation for future study is to determine if the direction toward which the marked tracheal tube is pointed will affect the direction that the suction catheter takes.
CHAPTER VI

SUMMARY

Maintenance of an unobstructed airway is necessary to permit adequate oxygenation. Suctioning is an accepted procedure which is utilized to remove secretions from the large airways of the tracheobronchial tree. The suctioning procedure is necessary for the elimination of secretions in patients having a tracheal tube in place and for those patients unable to effectively cough and clear their own secretions.

The ability to remove secretions from the left main stem bronchus is less effective than the ability to remove secretions from the right main stem bronchus, since the left side is more difficult to catheterize. The present study was concerned with use of the left lateral body position to selectively catheterize the left main stem bronchus.

Twelve subjects were studied in the intensive care units at a southwestern university hospital. During the control procedure, the subject was placed in a supine position with the head of the bed elevated to 45 degrees. A suction catheter was then passed into the tracheal tube while the head was turned to the right. During the experimental procedure the subject was turned on his left side at
a 90 degree angle to the bed with the head of the bed elevated to 45 degrees. A suction catheter was then passed into the tracheal tube while the head was turned to the right. The location of the radiopaque catheter was determined on a routine chest roentgenogram.

Eight subjects had both the control and experimental procedure and four had either the experimental or control procedure. The findings in both the eight subjects who served as their own control and in all subjects were submitted to statistical analysis. The investigator was unable to consistently selectively suction the left main stem bronchus utilizing the control or experimental procedure.

It is evident from the present study and from conclusions drawn from the literature that persons performing the suctioning procedure cannot predetermine the main stem bronchus that will be catheterized. Turning the patient's head to the right either alone or in conjunction with turning the patient's body to the left does not enable selective catheterization of the left main stem bronchus. Adjunctive measures to the suctioning procedure such as postural drainage, percussion and vibration, adequate hydration, and stimulating the patient's cough are needed to enable effective removal of secretions from the tracheobronchial tree.

The practice of turning the patient's head to the right has come to be accepted as the standard nursing
procedure for catheterizing the left main stem bronchus. The latter procedure is not supported by experimental evidence and should be rejected as standard care.

Further studies are recommended to determine the effectiveness of the angle-tip catheter in facilitating selective catheterization of the left main stem bronchus in conjunction with turning the subject's body to the left, to determine the frequency of left sided secretion-related problems, and to determine if the direction in which the tracheal tube is pointed will affect the direction that the suction catheter takes. Findings of future studies will aid the nurse in providing optimal airway care.
APPENDIX A

LETTER OF APPROVAL FROM COMMITTEE ON HUMAN SUBJECTS

April 28, 1976

Sally Ann Santmyer, R.N.
College of Nursing
Campus

Dear Ms. Santmyer,

The Human Subjects Committee has reviewed and approved your proposal entitled "The Use of Body Position to Selectively Suction the Left Main Stem Bronchus," effective April 28, 1976. The Committee suggests, however, that the consent form should mention the possibility of oxygen being given because of shortness of breath but that this would be done anyway, regardless of the study.

The Human Subjects Committee is available to consider any problems which might arise with regard to the use of human subjects. Any changes from the procedures proposed in your project as approved require review by the Committee. You should also report to the Committee any physical or psychological injury to the subjects which results from their participation in the project.

Sincerely,

/s/Milan Novak, M.D., Ph.D., Chairman
Human Subjects Committee

MN/ca

cc: Dr. Kassander
APPENDIX B

PATIENT PROFILE SHEET

Patient Number

Patient Data:
- Age
- Sex
- Race
- Diagnosis
- Location

Tracheal Tube Data:
- Type:
  - Tracheostomy
  - Nasotracheal
  - Orotracheal
- Cuff Inflated:
  - Yes
  - No
- Size of Tube:
  - Internal Diameter
  - External Diameter
- Length of Time Tube in Place:
- Mechanical Ventilation in Operation at Time of Study:
  - Yes
  - No
- Size of Suction Catheter Used

33
Location of Suction Catheter by Radiographic Determination:

Control Procedure:
- Left Main Stem Bronchus
- Right Main Stem Bronchus

Experimental Procedure:
- Left Main Stem Bronchus
- Right Main Stem Bronchus
Project Title: Use of Body Position to Selectively Suction the Left Main Stem Bronchus

I am conducting an investigation to determine if a patient's body position will have an effect on the ability of nursing personnel to adequately suction (remove) mucous from the large air tubes. In order to provide proper care when a patient has a tracheal tube (tube in the windpipe) in place, it is necessary to frequently suction out mucous from the air tubes leading to both lungs. Chest X-rays are routinely ordered during the time when a patient has a tracheal tube in place.

On two separate occasions, I will be with you at the time of routinely ordered chest X-ray. Before the X-ray, I will do the routine suctioning of your larger air tubes to clear them of secretions and will give you several breaths of oxygen. For this study I will then insert one end of a suction catheter that is visible on X-ray through your tracheal tube into your air tubes and will tape the other end of the suction catheter to your cheek. On one occasion you will be turned to your left side prior to insertion of the catheter and your head will be turned to the right. On another occasion you will be on your back with your head turned to the right before the catheter is inserted. On both occasions, the chest X-ray will then be taken with you lying on your back. The position of the catheter will be determined later when the chest X-ray is developed. After the chest X-ray, the catheter will be removed and you will be given a deep breath with oxygen. Your routine chest X-ray normally takes five minutes. If you decide to participate in the study, the turning procedure will add approximately five minutes at most onto the usual amount of time needed for a chest X-ray. The information gained from this study will be helpful in assuring proper drainage of your lungs and in establishing improved procedures for caring for patients with similar problems.

Because suctioning and X-ray procedures will be routine in your care while you have a tracheal tube in place, there will be no significant risk to you added by this study. If you should experience shortness of breath
during this procedure, oxygen will be given by the routine procedure. You may experience some slight sensation of irritation or need to cough while the catheter is in place. There is no additional cost to you for your participation in this study.

I will answer any questions regarding this study that you may ask. You are free to withdraw or refuse to participate in this study at any time. If you do choose not to participate in this study, it will not affect the quality of your treatment or care.

Your identity will remain confidential and the information obtained from this study will be recorded and analyzed by a computer.

If you understand what is involved and you consent to participate in this study, please sign your name below.

The nature, requirements, risks, and benefits of this study have been explained to me and I understand what my participation involves. I understand that I may ask questions and that I am free to withdraw from the project at any time without ill will.

__________________________
Subject's Signature

Signature of Parent or Legally Authorized Representative

__________________________  __________
Relationship Date

I have carefully explained to the subject the nature of the above project. I certify to the best of my knowledge the subject signing this consent form understands clearly the nature, requirements, risks, and benefits involved in his participation in this study. A medical problem or language or educational barrier has not precluded a clear understanding of his/her involvement in this project.

__________________________
Investigator's Signature

__________________________
Date
REFERENCES


