THE EFFECTIVENESS OF SENSORY STIMULATION ON PATIENTS WITH POSTOPERATIVE URINARY RETENTION

by

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January 13, 1971
Date

DEDICATION

This manuscript is dedicated to my parents,

Marge and George Kushmaul,

who have helped me financially and supported me emotionally while I was completing this educational endeavor.

ACKNOWLEDGMENTS

Individual contributions to this work are many and far too numerous to mention, but a few people deserve the special notice given them here.

The researcher would like to acknowledge the willing cooperation and advice of her thesis committee: Dr. Arlene Putt, Chairman; Dr. Janelle Kruger; and Mary Shields.

Recognition is given to Cosina Kruger for her illustration of derma zones used in this research.

Grateful appreciation is extended to the eight physicians who gave their consent to have patients in the study sample and to the nursing staff of general surgical wards used in this study.

A sincere thanks is given to the patients who kindly and generously gave of their time, during illness, so that even a small attempt could be made toward improving care for others.

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ABSTRACT

Sensory stimulation adaptation theory was used as a framework in determining whether sensory stimulation techniques of brushing and icing are effective measures to induce voiding in patients with postoperative urinary retention.

Twenty female patients participated in this experimental study. There were five subjects in each of the following groups: (1) brushing and icing sensory stimulation techniques; (2) brushing sensory stimulation technique; (3) icing sensory stimulation technique; and, (4) no sensory stimulation technique.

The study's results did not support the hypothesis that sensory stimulation techniques are effective in inducing voiding in the patient with postoperative retention. Only 4 patients out of 20 responded to the sensory stimulation techniques: two patients who received brushing sensory stimulation technique voided, one voided after receiving the icing sensory stimulation technique and one voided after receiving brushing and icing sensory stimulation techniques.

Recommendations for further study include the replication of the study with a larger sample and male and

female patients, who have many different types of surgery. Investigation of different methods of duration of the sensory stimulation techniques is also recommended.

CHAPTER I

INTRODUCTION

"Catheterize in 8 to 10 hours if patient has not voided" is a familiar physician's order written on the chart of the postoperative patient. The problem of postoperative retention exists for many reasons. Anesthesia and drugs act upon the autonomic nervous system in such a manner that the simple reflex arc functions are dulled. The purpose of this study is to explore the use of external sensory stimulation techniques as a nursing intervention to induce voiding in patients with postoperative urinary retention.

Presentation of the Problem

A distended bladder may increase incisional pain, damage bladder tissue and predispose to urinary tract infections (Bergstrom, 1969). Although catheterization is widely reported in the medical and nursing literature (Santora, 1966). The purpose of this study is to explore the possibility of using external sensory stimulation to induce voiding in patients with postoperative urinary retention.

Statement of the Problem

This research seeks to answer the following question: Will the sensory stimulation techniques of both brushing and icing, or brushing alone, or icing alone, be effective measures to induce voiding in the patient with postoperative urinary retention?

Significance of the Problem

The problem this research seeks to solve is significant to nursing because the nursing intervention given to patients who are unable to evacuate their bladder should promote safety and comfort for the postoperative patient. Nursing needs to explore all possibilities for providing for the comfort and safety of patients. The quality of practice and service is related to the individual practitioner's knowledge, and understanding improves not only as nurses increase their experience but also as they draw upon and contribute to the development of an expanding body of theory (Dickoff and James, 1966).

Hypotheses to be Tested

The general hypothesis of the study is that the most effective sensory stimulation technique would be the combination of brushing and icing as compared to brushing or icing alone or no sensory stimulation.

The following sub-hypotheses will be tested in this study:

1. The mean amount of urine voided by the Brushing and Icing group is significantly greater than that voided by the Brushing group.

2. The mean amount of urine voided by the Brushing and Icing group is significantly greater than that voided by the Icing group.

3. The mean amount of urine voided by the Brushing and Icing group is significantly greater than that voided by the Control group.

4. The mean amount of urine voided by the Brushing group is significantly greater than that voided by the Icing group.

5. The mean amount of urine voided by the Brushing group is significantly greater than that voided by the Control group.

6. The mean amount of urine voided by the Icing group is significantly greater than that voided by the Control group.

Theoretical Framework

The theoretical framework for the clinical experimental techniques for this study will be based on the bladder physiology research conducted by Nyberg-Hansen

(1966) who described the innervation and nervous control of the bladder.

The sensory nervous system is the way in which the human organism gets information from the outside world. Adaptation according to Helson (1964) is not a static process; it is a changing of levels. Organisms are in a constantly changing environment and actual stimulation varies from moment to moment. Effects of stimulation initiate changes in the organisms.

Sensory adaptation deals with specific receptor systems rather than the whole organism. The sense receptors are classified as: exteroreceptors, proprioceptors, and visceroceptors. Appropriate stimulation brings about ionic exchange in the sense organs: this ionic exchange gives rise to the generator current which triggers the nerve impulse (Woodburne, 1968).

The sensory adaptation stimulation techniques used in this study are based on the techniques used by Sister Regina (1966) and Bergstrom (1969).

Application of Theory to Research Situation

The stimulus producing ionic change in the receptor initiates a nerve impulse. A diagram of the impulse's pathway is given in Figure 1.

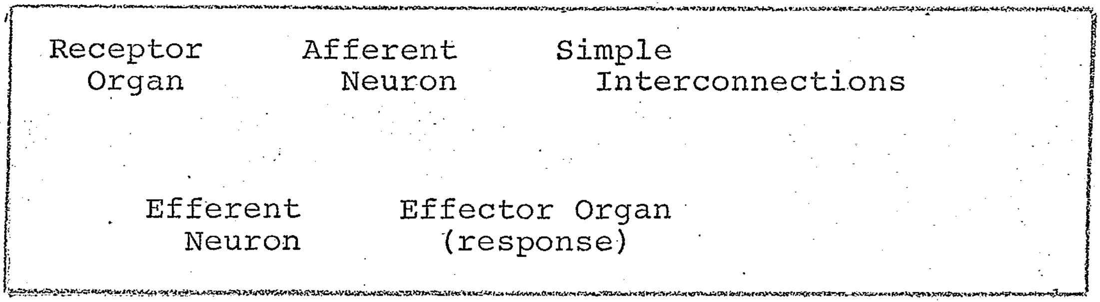

Figure 1. Diagram of Simple Reflex Arc Function

The urinary bladder is a hollow muscular organ. The smooth musculature of the bladder is innervated through the autonomic nervous system, sympathetic as well as parasympathetic divisions, while the striated external sphincter receives somatic innervation.

Impulses arising in the bladder are conveyed to the central nervous system by autonomic as well as by somatic afferent nerve fibers. Having reached the spinal cord by way of the dorsal root of the nerve afferents, the afferent impulses from the bladder may set up autonomic reflex activities at a spinal level, or they may be conveyed to supraspinal levels through ascending pathways (Nyberg-Hansen, 1966).

The smooth bladder musculature is innervated by the autonomic nervous system. Parasympathetic nerve fibers innervate the detrusor muscle, while sympathetic nerves appear to be distributed only to the trigonal muscle including the so-called internal sphincter, i.e., the regions of mesodermal origin.

Within the spinal cord, the impulses relaying the sensations of bladder fullness, pain from the bladder, pain and temperature from the urethra are conveyed by ascending fibers within the lateral spinothalamic tract in the lateral funiculus.

Excitatory and inhibitory effects on the micturition are exerted from different structures, namely, the cerebral cortex, the amygdala nuclear complex, the hypothalamus and the mesencephalon.

The descending pathways mediating the supraspinal influences onto the autonomic motor nuclei of the spinal cord are assumed to descend in central parts of the lateral funiculus (Nyberg-Hansen, 1966).

Normal micturition depends on the detrusor muscle, nerve fibers, spinal reflexes, and cortical regulating centers. After approximately 200 to 400 cubic centimeters (c.c.) of urine collect in the bladder, stretch receptors are stimulated sufficiently to send afferent impulses to the cord which initiates a desire to void and the micturition reflex.

Voiding results when the detrusor muscle contracts, causing the internal sphincter to open and permitting the urine to flow through the urethra.

Anesthesia and analgesics are known to decrease reflex excitability resulting in diminished peristalsis and loss of smooth muscle tone. Sensory stimulation techniques of brushing and icing provide added stimuli which sometimes are sufficiently persistent to overcome the threshold for stimulation produced by anesthesia and medication. Therefore, if stimulation is steadily increased, sensory endings in the bladder theoretically should be excited sufficiently to produce the micturition reflex in the presence of a full bladder (Bergstrom, 1969).

Summary Statements

In the application of the above theoretical framework to this research the following general assumptions are made:

1. Anesthesia and analgesics decrease excitability resulting in diminished peristalsis and loss of smooth muscle tone.

2. Anesthesia depresses synaptic transmission to visceral ganglia.

3. The derma zones have sensory nerve endings which respond to stimuli from the external environment and can be stimulated by touch, pressure, warmth, cold or pain.

4. Sensory stimulation is the process of exciting the sensory receptors to elicit specific motor and behavioral responses.

Definitions

For the purposes of this study, the following definitions of terms are used:

Nursing Intervention: The derma zones used in sensory stimulation cover the external oblique muscles of the abdomen in the area of the crest of the ilium to the groin, over the nerve endings of thoracic 11 and 12 (area A) and lumbar 1 and 2 (area B) as shown in Figure 2.

Ten strokes in a 30-second time period will be used. Three treatments will be given within an hour provided that the patient needs to have the treatment repeated. There will be a waiting period of 15 minutes before the next treatment is given. If the patient has not voided within an hour from the time the first treatment was given the treatment will be considered non-effective.

Brushing: Brushing is a sensory stimulation technique in which is used a battery-powered bar mixer with a French quill paint brush. The battery-powered brush rotates five revolutions per second.

Icing: Icing is a sensory stimulation technique in which an ordinary ice cube is wrapped in several thicknesses

///// - Area A

::::: - Area B

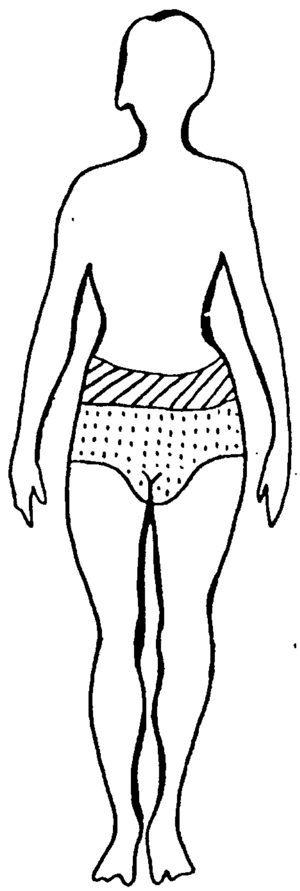

Figure 2. Sensory Stimulation Technique Derma Zones

Brushing and icing sensory stimulation techniques are applied from crest of ilium to groin, over nerve endings of thoracic 11 and 12 Area A; and lumbar 1 and 2 in Area B.

of gauze and used to stimulate the same receptor areas as used in the brushing sensory stimulation technique and for the same time period.

Brushing and Icing: Brushing and icing is a sensory stimulation technique in which brushing and icing techniques are used together on the same patient, with the brushing technique being used first for 30 seconds followed by the icing technique for 30 seconds. A 10-second interval elapses from the time the brushing technique was completed until the icing sensory stimulation technique was applied to the derma zones.

The same derma zones were used in all three techniques.

Sensory Receptors: There are three kinds of sensory receptors: exteroceptors, proprioceptors, and visceroceptors. Exteroceptors are lodged in the outer surface of the body and are used chiefly for awareness and for arousing the nervous system to action to protect the organism from harm. Proprioceptors are the sensory receptors found in muscles, tendon-muscle junctions, and under insertions of muscle on the bone. Visceroceptors are the sensory receptors of internal organs. Impulses may ascend via the visceral afferent fibers to the thalamus and the sensory cortex or by way of the visceral reflex in the spinal cord to the afferent fibers of the autonomic nervous system.

Professional Nurse Researcher: The professional nurse researcher in this study is a registered nurse with a Bachelor of Science degree in nursing who is a graduate student in the University of Arizona College of Nursing Master's Degree Program and is specializing in urology.

Limitations

In testing the stated hypotheses, this study is restricted by the following factors:

1. The study is a clinical experiment with limitations on control of variables.
2. The sample is limited to female patients who will be hospitalized for abdominal surgery and who have not had bladder or kidney surgery concurrent with this study.
3. The patients who will be receiving the sensory stimulation techniques will have received a general anesthetic.
4. The experimental nursing intervention will be considered non-effective if the patient has not voided within an hour after the first treatment was given.
5. This study is limited by the small number of study subjects.

6. The research is limited to three hospitals in the Tucson area.

7. This study is limited to volunteer study subjects.

Summary

This chapter has outlined the background concepts of bladder physiology and the effects of sensory stimulation, the problem to be studied, hypotheses to be tested, and the theoretical framework within which the research will be conducted.

The following chapter reviews literature related to catheterization and resulting bladder infections. Nursing literature cited deals with sensory stimulation.

The research design, the selected measurement instruments, and the study sample are discussed in Chapter III.

Analysis of the data collected from the research is presented in Chapter IV.

Findings of the study are related to the theoretical framework and recommendations for further study are discussed in Chapter V.

A summary of the information given in the first five chapters is presented in Chapter VI.

CHAPTER II

REVIEW OF LITERATURE

The following chapter discusses the published material that is related to problems central to this study.

Literature Related to Catheterization and Bladder Infection

Santora (1966) illustrated that preventing hospital-acquired urinary tract infections is a significant problem. She discusses the way in which the bacteria travel and the causative organisms of urinary tract infections. She concluded her article with nursing implications in caring for the patient who has to be catheterized.

Lindan and Keane (1964) stated that not only does the catheter transmit infection but careless handling of any part of the drainage apparatus at anytime, or inadequate hygiene of the periurethral area can also allow bacteria to enter the bladder. The author concluded that specially trained professional health members should constitute a "catheter team" to do all catheterizations, thus preventing the possibility of imposing a bladder infection on the patient.

Andrioli (1968) proposed that the patient whose urine becomes infected by catheterization is subjected to the risk of developing (1) cystitis if the bacteria invade the bladder, (2) acute pyelonephritis if the bacteria reach the kidney, or (3) life-threatening gram-negative septicemia if the organisms invade the bloodstream. In conclusion, he summarized the procedures that should be taken when catheterizing a patient and the care of the patient with an indwelling catheter.

Literature Related to Sensory Stimulation

Sister Elizabeth Regina (1966) stated that sensory stimulation can be effective in helping patients to void. She advocated the technique on female patients who had had abdominal surgery and found the techniques to be effective in stimulating the sluggish bladder to empty.

This study is based upon only female patients who have had abdominal surgery as did Bergstrom's (1969) study. However, in this study a control group is utilized and both sensory stimulation techniques of brushing and icing are used on the patients according to the treatment group to which they are randomly assigned.

Rood (1964) suggested several ways that sensory stimulation can be used to help patients. Brushing and icing, she stated, can be useful in stimulating the bladder to empty.

Literature Related to Bladder Innervation and Sensory Receptors

Nyberg-Hansen (1966) defined the innervation and nervous control of the urinary bladder. Parasympathetic fibers mediate excretory impulses leading to contraction of the detrusor muscle, resulting in micturition. The internal sphincter becomes a continuous extension of the fibers running longitudinally onto the posterior aspect of the urethral outlet.

Woodburne (1968) summarized the function of the sensory receptors: exteroceptors, proprioceptors and interoceptors. He concluded that the appropriate stimulus brings about ionic exchange in the sense organs; this ionic exchange gives rise to the generator current which triggers the nerve.

Gatz (1966) stated that the smooth muscle of the bladder responds to a stretch reflex operated by proprioceptors in its wall which send impulses over the pelvic splanchnic nerves to maintain tonus in the detrusor muscle while the bladder is filling.

CHAPTER III

RESEARCH PROCEDURES

This study concentrates on the effect of external sensory stimulation techniques of brushing and icing. In this study, it was hypothesized that external sensory stimulation techniques when applied to the appropriate derma zones would be effective in enabling the patient with postoperative urinary retention to void. This chapter will describe the design, the procedure, and the instruments used to achieve the purpose of the study.

Design of Study

Patients who were encountered in a state of postoperative urinary retention and who gave their permission were randomly assigned to a treatment group in an experimental design. The random assignment was made to one of the following groups;

1. The Brushing and Icing group who received the brushing and icing sensory stimulation technique.
2. The Brushing group who received the brushing sensory stimulation technique.
3. The Icing group who received the icing sensory stimulation technique.

4. The Control group who did not receive any of the experimental sensory stimulation techniques.

Establishment of reliability and validity of the technique applied was attempted by the researcher, who, in the nursing role, will be applying the sensory stimulation techniques. The time of the treatment and the intensity of the treatment was the same for all patients in a group. The treatment was repeated three times during the hour that the testing is being done. The amount of fluid intake and the amount of urine voided was recorded for each patient.

Measurement of Effectiveness of the Sensory Stimulation Technique

Criteria establishing the effectiveness of the nursing intervention with the sensory stimulation technique are as follows:

1. The patient voids at least 100 c.c. of urine after the application of the treatment.

2. The patient demonstrates the ability to void voluntarily after the sensory stimulation techniques have been stopped.

The nursing intervention of sensory stimulation techniques will be applied when all of the following circumstances pertain:

1. The female patient with abdominal surgery is unable to void postoperatively.

2. The patient has received at least 1000 c.c. of intravenous fluid in a 6 to 12 hour time period after surgery.

3. The abdomen above the pubic area is distended.

Target Population and Study Sample

The target population for the study was composed of all patients who met the following criteria by being:

1. Female patients having abdominal surgery;

2. Under the care of one of eight physicians who consented to have their patients included in the study;

3. Given a general anesthetic;

4. Given at least 1000 c.c. of intravenous fluid in a 6 to 8 hour time period after surgery.

A total of 20 patients met these criteria and were selected for the study sample. All 20 of these patients were treated according to the treatment group to which they were randomly assigned. The data on these 20 patients are presented in this study.

Test of Design

The study design was tested with four patients and was found to meet the requirements needed to obtain the desired information. The data collected from this pilot study are not included in the final research data analysis.

Analysis of Data

The data collected for each patient were recorded on raw data sheets, shown in the Appendix, and transferred to data processing cards for computer analysis.

The raw data were analyzed by using the t-test with .05 as the chosen level of significance.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The findings and the statistical analysis of the data collected from this study are given in this chapter. First, the characteristics of the sample will be given. Age, type of surgery and the amount of fluid intake for each group will be discussed.

Second, brushing and icing technique data will be compared to brushing technique, icing technique and Control group data. Third, the data on the time required for the patient to void after leaving the recovery room will be discussed.

Characteristics of the Sample

The study sample consisted of 20 female patients. The data on age are presented in Table 1. The mean age for the Brushing and Icing group was 43.20 years, and the standard deviation was 21.58. The mean age for the Brushing group was 51.00 years and the standard deviation was 21.88. The mean age for the Icing group was 59.40 years and the standard deviation was 18.44. The mean age for the Control group was 52.60 years and the standard deviation was 16.04. The age range of 50 years was similar for three groups;

Table 1. Data Related to the Age of Each Sample Group.

	Age in Years			
Individual	Brushing & Icing	Brushing	Icing	Control
1	51	32	21	25
2	77	75	68	56
3	34	72	48	67
4	22	48	61	58
5	32	28	59	57
Total	216	255	257	263
Mean	43.20	51.00	59.40	52.60
Standard Deviation	21.58	21.88	18.44	16.04

Brushing and Icing group was the only group to have a mean in the 40-year range.

The modal type of surgery was a cholecystectomy. Three persons each in the groups Brushing and Icing, Brushing, and Icing, and five persons in the Control group had cholecystectomies. One person each in the Brushing and Icing group and the Icing group had an umbilical hernia repair. One person in the Icing group had an appendectomy. One person in the Brushing and Icing group and the Brushing group had an exploratory laparotomy. One person in the Brushing group had an inguinal hernia repair.

The data on fluid intake by intravenous route for the four sample groups is given in Table 2. In accordance with the physician's orders, none of the patients received fluids by mouth. The mean amount of intravenous fluid was similar for all four groups, ranging from 1220 c.c. to 1700 c.c. of fluid. A one-tailed t-test was used to calculate the difference between the mean of fluid intake of each pair of groups. The results are shown in Table 2.

The difference in means of fluid intake among the groups ranged from a probability of .013 for the Brushing and Icing and the Icing group to .40 for the Brushing and the Control groups. The least difference was between the Brushing and the Control groups with a probability of .40. The only statistically significant difference ($p = .013$) with respect to the amount of postoperative intravenous fluid intake was between the Brushing and Icing and the Icing group.

Data Related to the Hypotheses

This section of Chapter IV presents the data related to the six hypotheses in this study. The data on the amounts of urine voided by patients in the four sample groups are given in Table 3. The mean amount of urine voided by the four groups ranged from 20 c.c. for the Icing

Table 2. Data Related to Fluid Intake of Each Sample Group.

	Amount of Intravenous Fluid in Cubic Centimeters			
Individual	Brushing & Icing	Brushing	Icing	Control
1	2000	1200	1000	1050
2	1500	1000	1700	1600
3	2000	1500	1200	1500
4	1500	1650	1200	1500
5	1500	2000	1000	2000
Total	8500	7350	6100	7650
Mean	1700	1470	1220	1530
Standard Deviation	273.86	389.71	286.35	338.37

t-value	B&I:B	B&I:I	B&I:C	B:I	B:C	I:C
	1.08	2.71	.85	1.15	.26	1.53
Degrees of Freedom	8	8	8	8	8	8
Probability	.16	.013*	.21	.15	.40	.08

*Statistically significant at .05 level.

Table 3. Data Related to Amount of Urine Voided by Each Sample Group.

	Amount of Urine in Cubic Centimeters			
Individual	Brushing & Icing	Brushing	Icing	Control
1	200	75	0	410
2	0	300	0	110
3	0	0	0	175
4	0	0	100	250
5	0	0	0	100
Total	200	375	100	1045
Mean	40	75	20	209
Standard Deviation	89.44	129.90	44.72	127.39

t-value	B&I:B	B&I:I	B&I:C	B:I	B:C	I:C
	.49	.44	-2.42	.89	-1.64	-3.13
Degrees of Freedom	8	8	8	8	8	8
Probability	.31	.33	.02*	.19	.06	.007*

*Level of significance is 0.05.

group to 209 c.c. for the Control group. Intermediate mean amounts were 40 c.c. for the Brushing and Icing group and 75 c.c. for the Brushing group. The standard deviations were unusually large, ranging from 44.72 for the Icing group to 129.90 for the Brushing group. The large standard deviations exemplify extreme dispersion among a small number of cases.

The general hypotheses stated that the sensory stimulation techniques of brushing and icing would be the most effective technique in stimulating voiding in the patient with postoperative urinary retention. The data regarding the effectiveness of the three sensory stimulation techniques are given in Table 3.

Hypothesis 1 stated that the mean amount of urine voided by the Brushing and Icing group would be significantly greater than that voided by the Brushing group. The t-value for the difference between the means of the Brushing and Icing group and the Brushing group is .49. This t-value has a probability level of .31 less than the stated .05 level of significance and, therefore, the hypothesis is rejected.

Hypothesis 2 stated that the mean amount of urine voided by the Brushing and Icing group would be significantly greater than that voided by the Icing group. The t-value for the difference between means of the Brushing and Icing group and the Icing group is .44. This t-value has a probability level of .33 and, therefore, the hypothesis is rejected.

Hypothesis 3 stated that the mean amount of urine voided by the Brushing and Icing group would be significantly greater than that of the Control group. The t-value computed for the difference between the means of the Brushing and Icing group and the Control group is -2.42. This t-value has a probability level of .02 which is greater than the .05 level of significance but in the opposite direction. Hypothesis 3, therefore, is rejected.

Hypothesis 4 stated that the mean amount of urine voided by the Brushing group would be significantly greater than that voided by the Icing group. The t-value computed for the difference between the means of the Brushing group and the Icing group is .89. This t-value has a probability level of .19 and, therefore, Hypothesis 4 is rejected.

Hypothesis 5 stated that the mean amount of urine voided by the Brushing group would be significantly greater than that voided by the Control group. The t-value computed for the difference between means of the Brushing group and the Control group is -1.64. This t-value has a probability level of .06 in the opposite direction from that hypothesized, therefore, the hypothesis is rejected.

Hypothesis 6 stated that the mean amount of urine voided by the Icing group would be significantly greater than that of the Control group. The t-value computed for the difference between the means of the Icing group and the Control group is -3.13. This value is statistically significant at the .007 level but in the opposite direction from that hypothesized. Therefore, the hypothesis is rejected.

Time Record of Patient's Voiding

A record of the length of time between patients' leaving the recovery room and their first voiding might provide evidence of a voiding pattern. This voiding pattern would be useful as a guide for nursing intervention regarding the patient with postoperative urinary retention.

Table 4 presents the number of minutes from the recovery room to the time of voiding for the patients in the four sample groups. The mean number of minutes from the recovery room to the time of voiding ranged from 321.00 minutes for the Control group to 432.00 minutes for the Brushing and Icing group. The Icing group with a mean number of minutes of 369.00 and the Brushing group with 382.00 minutes represented intermediate values. Standard deviations were large and ranged from 54.61 for the Brushing group to 83.32 for the Control group.

Table 4. Data Related to Time of Voiding After Patient Left Recovery Room for Each Sample Group.

Individual	Number of Minutes from Recovery Room to the Time of Voiding: Brushing & Icing	Brushing	Icing	Control	
1	425	265	330	300	
2	370	450	390	295	
3	495	385	250	440	
4	480	370	415	210	
5	390	440	400	360	
Total	2160	1910	1885	1605	
Standard Deviation	54.61	73.87	81.42	85.32	

	B&I:B	B&I:I	B&I:C	B:I	B:C	I:C
t-value	1.21	1.43	-2.45	.26	1.20	.91
Degrees of Freedom	8	8	8	8	8	8
Probability	.21	.09	.02*	.39	.13	.19

*Level of significance is 0.05.

The t-values for the time in minutes from recovery room to the time of application of sensory stimulation in all four sample groups are given in Table 4. The probability levels ranged from .02 to .39. The Brushing and Icing group and the Control group probability levels were statistically significant in a reverse direction. That is, all the Control group patients voided and voided sooner than did the patients in the Brushing and Icing treatment groups.

Summary

In tabular form, the raw data, means and standard deviations, and t-values were presented for the four sample groups. A one-tailed t-test for the difference between means was computed for the following:

1. Amount of urine voided by each sample group after the application of the sensory stimulation technique.

2. Amount of fluid intake in each sample group.

3. Time in minutes from the recovery room to the time of voiding or the time of the application of the sensory stimulation technique in the sample group.

All six of the sub-hypotheses in this study were rejected.

CHAPTER V

DISCUSSION OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

In the following chapter, research findings are summarized, the relationship of the findings to the theoretical framework is discussed, and the conclusions and recommendations for further study are given.

Findings

The difference in the mean amount of fluid intake was statistically significant (0.013) for the Brushing and Icing group and the Icing group. All 20 patients received fluid sufficient to provide for urinary output but were not overly hydrated. Of the response to treatment, the Brushing group was numerically predominant. In the Brushing group there were two responses to the sensory stimulation technique, and in both the Brushing and Icing and the Icing group there was one successful response. All the patients in the Control group voided.

Lack of nursing intervention seemed to permit faster return to the normal voiding pattern. Therefore, the nursing ritual of using the sensory stimulation technique should be questioned. However, the techniques applied by a regular staff nurse who would not be a stranger to the patient might produce different results.

The effect of cold on neural and muscle response should be considered. The nerve receptors respond to cold by producing a constriction of blood vessels and contraction of the muscle. Thus the application of cold as a sensory stimulation technique would make relaxation of the bladder sphincter doubtful. Brushing stimulation may have produced more response from the patients because brushing may have stimulated the nerve receptors and the muscles.

The six sub-hypotheses in this study were rejected. The researcher hypothesized that the combination of the brushing and icing sensory stimulation technique would promote voiding in the patient with postoperative urinary retention. The patients in the Control group, which did not receive the experimental sensory stimulation techniques, voided sooner than did those patients in the other three sample groups.

The findings of this research show that sensory stimulation techniques, as hypothesized in this study, were not effective, at a statistically significant level, as a means of inducing the postoperative patient with urinary retention to void.

Relationship of Findings to the Theoretical Framework

A theory of sensory stimulation provides nursing with a useful tool to help the patient with urinary retention to empty his bladder. The nursing intervention of using sensory stimulation techniques theoretically provides the added stimuli which are sufficient to overcome the threshold for stimulation produced by anesthesia and medications.

When a stimulus is suddenly applied to a sensory receptor, the receptor usually responds very vigorously at first, but progressively less and less so during the next few seconds or minutes. This loss of sensation during prolonged stimulation is called adaptation of the sensory receptor. Adaptation occurs to a much greater degree for some sensations than others (Ganong, 1969).

The failure of the sensory stimulation technique used in this study to promote voiding in the patient with postoperative retention may have been due to the failure to reach the necessary firing potentials of the nerve endings in the derma zones, thus providing only a slight sensation so that adaptation of the sensory receptor took place. Therefore, the nerve receptor was not stimulated effectively and voiding did not result.

Another factor which may influence the effectiveness of the sensory stimulation technique in stimulating the sense receptor to the fullest potential is the response of the bladder to the stimulus. Sensations are received by special nerve endings in the skin, in the muscles and deeper areas of the body, and these transmit impulses through the nerve tracks into the spinal cord. Normal vesical action depends upon an intact nerve supply.

The sacral portion of the spinal cord, which contains the center controlling micturition is at the level of the second, third and fourth sacral vertebrae. The motor nerves to the detrusor muscle are part of the parasympathetic nervous system. They arise from the second, third and fourth sacral vertebrae and reach the bladder wall through the pelvic nerves.

Sensations from the urethra and bladder are returned to the central nervous system by fibers which travel the parasympathetic nerves, the second through the fourth somatic sacral nerves, and the ninth thoracic to the second lumbar motor nerves. The parasympathetic nerves carry the sensory stretch receptors.

The failure of the sensory stimulation techniques, as used in this study, to promote voiding in patients with postoperative urinary retention may be due to the lack of any change in the stimulation to muscle fibers of the bladder wall (Smith, 1969).

Conclusions and Recommendations

The findings of this research show that sensory stimulation techniques were not effective at a statistically significant level as a means of inducing voiding in the patient with urinary retention.

Recommendations for future nursing research include:

1. Investigation of different methods of time application of the sensory stimulation technique.

2. Investigation of the effects of sensory stimulation techniques on bladder physiology by the use of a cystometrogram on a patient who has not received any medication or anesthesia and has no bladder pathology.

3. Replication of this study with a larger number of patients in the sample.

4. Replication of this study using both male and female patients who have undergone any major type of surgery involving anesthesia and medication.

5. The use of sensory stimulation techniques of brushing and warmth to determine whether this combination could induce voiding.

6. The application of the sensory stimulation technique of brushing only and warmth only.

7. Investigation of the effect of the sensory stimulation technique of patients with urinary retention when applied by the staff nurse who is continually in the clinical setting.

8. Study of the effect of suggestion on the patient who is receiving the sensory stimulation technique.

CHAPTER VI

SUMMARY

The study described in the preceding chapters was an attempt to apply a theory of sensory stimulation to provide a nursing intervention for patients with post-operative urinary retention. This theory proposes that sensory stimulation provides a safer nursing intervention than catheterization because it allows a normal physiological response thus maintaining an uninterrupted urinary system.

Purpose of the Study

The purpose of this study was to further knowledge about sensory stimulation techniques and bladder response to sensory stimulation.

Specifically, the study attempted to determine if brushing and icing sensory stimulation techniques were effective in causing micturition.

The problem researched was to determine whether brushing and icing, brushing, or icing was the most effective sensory stimulation technique to induce voiding.

This problem is significant because:

1. The answer will affect nursing interventions regarding urinary retention.

2. The prevention of urinary bladder infection due to catheterization is a nursing responsibility.

Literature summarized in Chapter II indicated that the occurrence of bladder infection is a common problem and its prevention is the nurse's responsibility.

Studies have been reviewed in which icing techniques were used on surgical patients and brushing and icing techniques were used on paraplegic and emphysemic patients.

Methodology

The design of the study involved the application of brushing and icing sensory stimulation techniques on patients who were unable to empty their bladder after abdominal surgery. There were four study groups. One group received brushing and icing sensory stimulation technique, one group received brushing sensory stimulation technique, one group received icing sensory stimulation technique and the control group did not receive any sensory stimulation technique.

The sample for the study consisted of 20 female patients who met the following criteria:

1. Had received only a general anesthesia.

2. Had abdominal surgery.

3. Had received at least 1000 c.c. intravenous fluid since surgery.

4. Were willing to participate in the study.

5. Were under the care of one of eight physicians who consented to have their patients included in this study.

Findings

The difference in the mean amount of fluid intake was statistically significant (0.013) only for the Brushing and Icing and the Icing groups. All 20 patients received fluid in amounts sufficient to provide for urinary output but were not overly hydrated.

The six hypotheses in this study were rejected. The researcher hypothesized that the combination of the brushing and icing sensory stimulation technique would be most effective in promoting voiding in the patient with postoperative urinary retention. The Control group which did not receive the experimental sensory stimulation technique voided more and sooner than did the other three sample groups.

The findings of this investigation show that the sensory stimulation techniques were not effective at a statistically significant level as a means of inducing the postoperative patient with urinary retention to void.

Conclusions and Recommendations

The six sub-hypotheses in this study were rejected. The findings show that sensory stimulation techniques were not effective at a statistically significant level as a means of inducing voiding in the patient with urinary retention.

Recommendations for future nursing research include:

1. Investigation of different methods of time application of the sensory stimulation technique and the results.

2. Investigation of the effects of sensory stimulation techniques on bladder physiology by the use of cystometrogram on a patient who has not received any medication or anesthesia and has no bladder pathology.

3. Replication of this study with a larger number of patients in the sample.

4. Replication of this study using both male and female patients who have undergone any major type of surgery involving anesthesia and medication.

5. The application of brushing and warmth sensory stimulation techniques to determine whether this combination could induce voiding.

6. The application of the sensory stimulation technique of brushing only.

7. Investigation of the effect of the sensory stimulation technique of patients with urinary retention applied by the staff nurse who is continually in the clinical setting.

8. Study of the effect of suggestion on the patient who is receiving the sensory stimulation technique.

APPENDIX

RAW DATA SHEET

Name of patient:

Age:

Surgery:

Doctor:

Fluid Intake:

Time of Treatment Started: Ended:

1.

2.

3.

Name of Group:

Time released from recovery room:

Comments:

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