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The Incidence of Methods of Postoperative Bladder Evacuation

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THE INCIDENCE OF METHODS OF POSTOPERATIVE BLADDER EVACUATION

by

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I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

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Joan Marie Zabady

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CHAPTER I

INTRODUCTION

Since the discovery of anesthesia, each passing year has brought greater advances in the techniques of surgery. This has resulted in more extensive operations and removal, or revision, of increasing amounts of the human anatomy. This, in turn, has required constant increase in the length and depth of anesthesia. According to Davis these factors serve to complicate postoperative patient care for they contribute to the development of that frequent and distressing complication, postoperative urinary retention.[1]

The surgeon has waged war against postoperative urinary retention for years. It was recognized as a major problem by Taussig who studied the incidence of this complication in the year 1915.[2] Since Taussig's pioneer work, a constellation of studies have formed around the subject of postoperative urinary retention and its treatment. The most recent of these was conducted twelve years ago, in 1950, by Treiger.[3]

Although the researchists disagreed on the method they proposed for the reduction of postoperative urinary retention, they all agreed on the fact that catheterization, intermittent or retention, was a

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[1]Harry A. Davis, Principles of Surgical Physiology (New York: Hoeber-Harper Incorporated, 1957), p. 639.

[2]F. G. Taussig, "Bladder Function After Confinement and After Gynecological Operation," Transactions of the American Gynecological Society, 40:351, June, 1915.

[3]Philip Treiger, et. al., "Physiopsychologic Treatment for Postoperative Urinary Retention," American Journal of Surgery, 80:195-197, August, 1950.

relief measure which must be instituted if the micturition reflex failed to respond to their proposed method of stimuli. This view of the role of the catheter is supported by the authors of even the newest medical texts treating the subject of postoperative care. The text by Davis exemplifies this,[4] as does the work of Thorek.[5]

On the other hand, Desautels and Harrison are but two of many voices heard in the rising tide of concern regarding the indiscriminate use of the catheter, whether for the relief of postoperative retention or any other cause.[6] Their concern was based on the results of studies such as the one done by Slade and Linton who reported that the catheter was the source of most urinary tract infections.[7] The chapter which reports the review of literature contains reports of several other studies which support the results achieved and the conclusions drawn by Slade and Linton.

It became obvious, after even a brief review of current literature, that the whole subject of postoperative urinary retention and catheterization is one of great controversy at present.

I. STATEMENT OF THE PROBLEM

The problem of this study was to survey the incidence of the various methods of postoperative bladder evacuation.

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[4]Davis, op. cit., p. 638.

[5]Philip Thorek, Illustrated Preoperative and Postoperative Care (Philadelphia: J. B. Lippincott Co., 1958), p. 75.

[6]Robert E. Desautels and J. Hartwell Harrison, "The Mismanagement of the Urethral Catheter," The Medical Clinics of North America, David M. Davis, (ed.), Vol. 43, No. 6, (Philadelphia: W. B. Saunders Company, 1959), p. 1583.

[7]N. Slade and K. B. Linton, "Catheters and the Female Patient," British Journal of Urology, 32:316-421, December, 1960.

II. PURPOSE OF THE STUDY

The major purpose of this descriptive survey was to find out if the incidence of postoperative catheterization could be reduced in order to decrease the events of postoperative urinary tract infection by removing one major source of this condition.

Several adjuvant purposes of the study were to (1) find out what current postoperative bladder evacuation methods were in two selected hospitals, (2) find out what changes, if any, had occurred in these methods since earlier investigations, and (3) discover the current relationships of the postoperative method of bladder evacuation to various factors such as age, sex, marital status, admission status, type of operation and type and length of anesthesia. Previous investigations excluded patients who had retention catheters. The retention catheter had become more suspect of contributing to bacteruria than the intermittent use of the catheter. It was therefore, another purpose of the study to assess the current incidence of the use of the retention catheter as a preventive of postoperative urinary retention.

III. NEED FOR THE SURVEY

Although there have been many studies performed regarding the use of the catheter for postoperative urinary retention, the most recent one found was twelve years old at the time this survey was begun. Within the last twelve years there have been many changes in the techniques of surgery and anesthesia. There have also been changes in the type, length and extent of operations performed. All of these factors would influence the incidence of urinary retention following surgery, thus influencing the necessity for catheterization. Some

of these factors were expected to have a depressing influence on the incidence of use and others were expected to have an inflationary influence on the incidence of use. Therefore any current studies which would be based on the statistics of incidence of catheterization for postoperative urinary retention cited in studies done twelve or more years ago would be highly questionable.

In addition, within the last twelve years, the publication of studies indicating the catheter as the cause of most urinary tract infections has increased. It was felt that this increased the importance of the need for restudy of the incidence, prevention and treatment of postoperative urinary retention. The serious consequences which can result from lower urinary tract infections were well known. In these days of increasing bacterial resistance to antibiotic therapy, the possibility of overwhelming urinary infections became acute. It was therefore, essential to reduce the chance of infection by reducing the number of catheterizations performed. One area in which that reduction was felt to be possible was that of postoperative care.

It was hoped that the results of this survey would indicate whether some progress toward the reduction of the number of catheterizations had or had not been achieved. It was also hoped that in either event, the survey could provide a stimulus for further study of the problem.

IV. ASSUMPTIONS

The following assumptions were made in the conduction of the study:

1. The occurrence of catheterization for prevention, or relief, of postoperative urinary retention would be identifiable in the patients' hospital record by the examination of the record of physicians' orders, progress notes and nurses' notes.

2. Catheterization is a nursing technique of such importance that failure to record the treatment would occur so infrequently as to be negligible in its effect on the results of the survey.

3. There may be a difference in the incidence of catheterization to prevent, or relieve, urinary retention following surgery of the private patient and the clinic patient.[8]

4. The hospitals selected for the study are representative of the quality of patient care, surgical skill, and operative management found in hospitals of similar type.

5. No special emphasis was placed by the surgical or nursing teams on the prevention of catheterization postoperatively during the time of the study.

V. LIMITATIONS

1. Children under twelve years and patients who had surgery of the genito-urinary tract, or whose surgery was not performed under general anesthesia, were excluded from this study.

2. Only adult patients who qualified for the study who had surgery between October 1, 1961, and December 31, 1961, were included in the survey.

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[8]Treiger, loc. cit.; and Claus G. Jordan, "Postoperative Urinary Retention," Annals of Surgery, 98:125-135, January, 1933.

3. All information for the survey was obtained from the patient's hospital record instead of by direct observation.

4. The survey was limited to two hospitals, one of which represented the teaching hospital with a large clinic clientele and the other of which had a clientele composed primarily of privately tended patients.

IV. DEFINITION OF TERMS

For the purpose of this study certain terms were defined in the manner which follows:

Adult. Any patient who was eighteen years of age or over was considered to be an adult.

Postoperative urinary retention. Postoperative urinary retention was that condition in which there was absence of urination after eight or more hours had elapsed from the conclusion of surgery, or when the bladder became distended with urine, whether pain was present or not, thus necessitating catheterization for relief of the problem.

General anesthesia. Any anesthesia, no matter how induced, which produced loss of consciousness and/or loss of sensation of one-half or more of the body was considered to be general anesthesia.

Retention catheter. A retention catheter was one which was retained in the urinary tract for twelve hours or longer by inflation of a rubber bulb or any other means.

Catheterization. Catheterization was the process of insertion of the tip of a hollow rubber tube in the bladder for the purpose of withdrawal of urine from the bladder or instillation of a substance into the bladder.

Intermittent catheterization. Intermittent catheterization was the insertion and withdrawal of a catheter one or more times during any one hospital stay when the catheter was retained in the bladder less than twelve hours.

VII. A DESCRIPTION OF THE METHODOLOGY OF THE STUDY

A review of literature was made prior to the study to discover the methods used and the results of earlier studies made of the subjects of postoperative urinary retention, catheterization for postoperative urinary retention, and the effects of catheterization.

The scope of the study was delimited to deal with the incidence of voluntary voiding and of catheterization to prevent, or relieve, postoperative urinary retention.

Two hospitals were selected in which to conduct the study. Hospital records of all patients who qualified for the study were surveyed to discover how many patients voided voluntarily or had retention or intermittent catheterizations postoperatively. The data obtained were classified and analyzed for incidence by (1) age, (2) sex, (3) marital status, (4) whether private or clinic patient, (5) type of surgery, (6) type and (7) length of anesthesia, (8) amount of time elapsing between the end of anesthesia and the time of the first voiding or catheterization, and (9) the amount of urine voided or withdrawn.

Conclusions were then drawn following a comparison of the data with that of several earlier studies. Recommendations were also made for further study of the subject.

CHAPTER II

SURVEY OF PERTINENT LITERATURE

I. INTRODUCTION

Literature was reviewed for several purposes: (1) to find studies reporting the incidence rate of postoperative urinary retention, (2) to elicit studies regarding the existence and effectiveness of methods of treatment of postoperative urinary retention including, and other than, catheterization, and (3) to find studies regarding any complications commonly resulting from catheterization.

II. INCIDENCE OF POSTOPERATIVE URINARY RETENTION

The first significant report of research on the incidence of postoperative retention was made in 1915 by Taussig.[1] A series of 410 patients who had had gynecological surgery, other than curettage, were studied. It was found that 311 patients voided. Ninety nine did not void. This resulted in a 23.2 per cent incidence of retention necessitating catheterization in this series of patients. Approximately two-thirds of the group who did void did so between seven and twelve hours after surgery. The amount of urine voided by the greatest number of patients was 180 cubic centimeters.

Curtis reports a higher incidence of retention in the study he performed in 1923. Study was made of 1,595 consecutive female patients

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[1]F. G. Taussig, "Bladder Function After Confinement and After Gynecological Operation," Transactions of the American Gynecological Society, 40:351, June, 1915.

who had major surgery. Retention occurred in 33 per cent of these patients.[2]

Mills analyzed the incidence of postoperative urine retention in the John Hopkins Hospital in 1924. He reported that 12.38 per cent of 2,254 patients exhibited urinary retention. The selection of patients for the Hopkins study was made on the basis of the following criteria: (1) they must have had an operation involving dissection of tissue, (2) they must have had a general anesthesia, (3) the anesthesia must have been administered by inhalation, (4) the patients included must have been viable at least twelve hours postoperatively, (5) they were to be twelve years of age or older, (6) they could not be comatose prior to, or abnormally long following, surgery, and, (7) all patients were to have had normal control of urinary function. All patients who had retention catheters or were obstetrical cases were excluded from the study. Mills found that the incidence varied with the type of operation performed, ranging from 45.2 per cent for patients having abdominal surgery of the female pelvic organs, to 1.5 per cent for patients who had surgery of the extremities. Women were more likely to need catheterization than men, and married women were more susceptible to the development of retention than were single females. Jewish females were found to be more sensitive to retention formation than Gentiles and colored females the least sensitive of all.[3]

Sachs, in 1928, stressed the need for psychic treatment of the

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[2]A. H. Curtis, "Management of the Female Urinary Bladder After Operation and During Pregnancy," Journal of the American Medical Association, 80:1126, April 21, 1923.

[3]R. G. Mills, "The Incidence of Postoperative Catheterization in the John Hopkins Hospital," Annals of Surgery, 99:813-839, June, 1924.

patient with urine retention stating that it was this type of treatment that was responsible for the reduction of postoperative urinary retention to 10.6 per cent in his surgical practice.[4] Kaufman did a survey of 300 cases in 1929 to assess the frequency of catheterization in general hospital practice. He included 100 general surgical patients, 100 gynecological surgery patients and 100 obstetrical cases in the study. The surgical patients had a 15 per cent incidence of retention, the gynecological patients 23 per cent and the obstetrical patients a 13 per cent incidence. The general percentage for all cases excluding the obstetrical patients was 17 per cent.[5]

Jordan conducted a survey of 644 cases to deduce the extent of the problem of operatively caused retention. His findings concurred with those of Mills regarding the more common occurrence in females than males. He further demonstrated that retention occurred more frequently in young adults than in older adults, and more often in private patients than in ward patients. Jordan also analyzed his group for incidence by type of anesthesia and found that the combination of gas and ether was the anesthesia for 27 per cent of the patients who developed postoperative urine retention. Spinal anesthesia ranked next with occurrence in 19.3 per cent of the patients who had retention. The incidence of retention varied with the type of surgery, also.[6] "The average incidence of postoperative urine retention after abdominal

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[4]Ernest Sachs, "Treatment of Postoperative Retention of Urine," Zentralblat Gynekologie, 52:1531, October, 1928.

[5]Louis Rene Kaufman, "Use of the Catheter in Retention," The American Journal of Surgery, 7:785, December, 1929.

[6]Claus G. Jordan, "Postoperative Urinary Retention," Annals of Surgery, 98:125, January, 1933.

operation was 18.6 per cent, after rectal and inguinal surgery, 14.9 per cent, and after operations on the rest of the body, 2.7 per cent."[7]

In 1944 McLaughlin and Brown observed the presence of post-operative retention in 1,964 male navy recruits who had undergone surgery for abdominal, perineal, inguinal and rectal lesions. The subjects ranged in age from 17 to 35 years with 90 per cent falling in the narrower range of 17 to 25 years. The authors stated that the fact that these patients were in good general physical condition and singularly free from urological disease afforded them an excellent opportunity to study postoperative urine retention without the complicating factors of general debility. The average incidence of retention in all subjects was 9.8 per cent.[8]

Treiger reports that the incidence of retention in 1,000 consecutive, unselected cases was 18.3 per cent. With the institution of physio-psychotherapy on a second 1,000 consecutive unselected cases the incidence dropped to 1.7 per cent. The control group incidence of 18.3 per cent compared almost exactly with Jordan's reported 18.6 per cent for abdominal surgeries.[9]

A rather comprehensive review of literature pertaining to urine retention was made and reported by McCurrich beginning with the year 1547 and ending in 1930.[10]

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[7] Ibid., p. 134; and Mills, op. cit.

[8] Charles W. McLaughlin Jr. and John R. Brown, "Postoperative Urinary Retention," United States Naval Medical Bulletin, 42:1025, May, 1944.

[9] Phillip Treiger, et. al., "Physio-psychological Treatment for Postoperative Urinary Retention," American Journal of Surgery, 80:195, August, 1950.

[10] H. J. McCurrich, "Retention of Urine," The British Medical Journal, 1:192-194, February 1, 1930.

III. METHODS OF TREATMENT OF POSTOPERATIVE URINARY RETENTION

Heat, in the form of baths and applications, was advised by Pott as early as 1778.[11] Since that time many treatments have been advocated for the relief of urinary retention without resorting to catheterization.

Jordan felt that there was no really superior treatment for postoperative urine retention and makes the following comment:

> Sachs, who believes in the psychic cause of retention, treats all his patients with psychotherapy and claims good results. Lampert, Henrickson and other Russian, German and French investigators, believing firmly that the cause of retention is a disturbance of the parasympathetic nervous system, treat their cases with pilocarpine.
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> Those who believe in a diminished sensitivity of the bladder mucosa as a cause use intravenous urotropin and cyclotropin with apparent success and others who believe in spasm of the internal sphincter as the sole cause of retention relieve this spasm by administration of potassium acetate. Pituitrin, which increases the power of the bladder muscle, is used by still another group.[12]

Treiger supports Sachs' theory of the efficacy of psychotherapy to relieve retention but adds that some physiotherapy is also indicated. In the study previously reported, a drop in incidence from 18.3 in the control group to 1.7 per cent in the experimental group is claimed. The experimental group were assisted in the reestablishment of the micturition reflex by frequent encouragement to void, a positive attitude on the part of the nursing staff, warmed bedpans or urinals,

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[11]Percival Pott, "Urine," Chirurgical Works, 2:199, 1778, cited by H. J. McCurrich, "Retention of Urine," The British Medical Journal, 1:192, February 1, 1930.

[12]Jordan, loc. cit.

hot water bottles to the perineum and the forcing of fluids.[13]

McLoughlin and Brown conducted a study in which the patients in the control group were offered the opportunity to void during the first eighteen hours postoperatively but were given no aids to voiding and were not allowed to stand to void. The incidence of retention under this regime was 21.9 per cent. The experimental group in this study was given prostigmin 1:2000 intramuscularly every four hours for eight doses and was allowed to go as long as twenty-four hours without voiding before being catheterized. These patients were also denied the privilege of standing to void. The incidence of retention in this group was only 0.76 per cent. The experiment was repeated substituting normal saline for the prostigmin with exactly the same results.

The conservative nursing measures employed for all three groups included the provision of privacy by screening, application of hot water bottles to the abdomen, warm water poured over the genitalia, and elevation of the back rest to high Foweler's position. It might be noted that the general average incidence of retention in the study was 9.8 per cent, which is considerably lower than the other general averages reported in other studies.[14]

Reams and Powell reported success in the reduction of postoperative retention by encouraging early voiding before pain became apparent, adequate hydration, standing to void, and the application of warm suprapubic compresses.[15]

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[13]Treiger, loc. cit.

[14]McLoughlin and Brown, loc. cit.

[15]Gerald B. Reams and Elma J. Powell, "Postoperative Catheterization--Yes or No?" American Journal of Nursing, 60:371, March, 1960.

In all cases and in all studies, the treatment employed either routinely, or as a last resort, was bladder catheterization.

IV. EFFECTS OF BLADDER CATHETERIZATION FOR RELIEF OF POSTOPERATIVE URINARY RETENTION

In 1957 Kass and Schneiderman did a pilot study on three patients to find out if bacteria could enter the bladder through the medium of the exudate which normally surrounds the catheter at the urethral meatus. A small amount of a culture of non-resident bacteria was applied to the periurethral epithelium of one female and two male patients who had indwelling catheters. In one to three days large numbers of the bacteria were recovered from the urine.[16]

Slade and Linton reported that, in a study of 100 patients following gynecological surgery, the forty-one patients who had indwelling catheters on open drainage had a 97 per cent incidence of infection. The fifty-nine patients who underwent intermittent catheterization were given antibiotics prophylacticly but had an infection rate of 27 per cent nonetheless. They also report that infection followed a single catheterization in 33 per cent of the patients who did not receive prophylactic antibiotics and that the infection rate was 14 per cent for those who did.[17]

Mulla reported a study done to discover if the use of antibiotic lubricant jelly would help reduce the urinary infection following

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[16]Edward H. Kass and Lawrence J. Schneiderman, "Entry of Bacteria into the Urinary Tract of Patients with Indwelling Catheters," New England Journal of Medicine, 256:556, March, 1957.

[17]N. Slade and K. B. Linton, "Catheters and the Female Patient," British Journal of Urology, 32:416, December, 1960.

catheterization. In a control group the incidence of bacterial contamination of the urine was 96 per cent. In the experimental group the incidence was reduced to 60 per cent. In the experimental group the lubricating jelly contained an antibiotic.[18]

Sexton made the comment that catheterization must be used following certain reconstructive pelvic operations even though he was well aware of the dangers of infection inherent in its use.[19] Desautels and Harrison concurred that catheterization should seldom be necessary if everything possible were done to encourage postoperative voiding before resorting to catheterization.[20]

V. SUMMARY

No general uniformity was found to exist in the incidence rates of postoperative urinary retention described in the studies found in this review of literature. The results of the studies by Mills, Jordan and Treiger approximated each other more closely than any of the other studies of incidence reviewed.[21] Perhaps it was no coincidence that these were also the studies with the greatest degree of similarity of study population. The greatest disparity among the three in the total incidences of retention reported was only 6 per cent.

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[18]Nejdat Mulla, "Indwelling Catheter in Gynecological Surgery," Obstetrics and Gynecology, 17:200, February, 1961.

[19]George L. Sexton, "Urinary Tract Infection and Indwelling Catheters," Obstetrics and Gynecology, 17:739, June, 1961.

[20]Robert E. Desautels and J. Hartwell Harrison, "The Mismanagement of the Urethral Catheter," The Medical Clinics of North America, David M. Davis (ed.), Vol. 43, No. 6, (Philadelphia: W. B. Saunders Company, 1959), p. 1583.

[21]Mills, op. cit., pp. 837-839; Jordan, op. cit., p. 132; and Treiger, op. cit., p. 197.

The studies reviewed failed to produce any information regarding the extent to which the retention catheter was being used to prevent postoperative retention. These studies also failed to produce any statistics regarding incidence of retention in patients undergoing chest surgery. This was explained by the fact that the most recent of the studies on incidence was more than a decade old.

It was interesting to note that the studies of incidence were all performed before the publication of the studies regarding the serious, deleterious effects of catheterization. The effect of these studies of catheterization and bacteruria on the use of the catheter became of great interest.

CHAPTER III

METHODOLOGY OF THE STUDY

I. THE RESEARCH DESIGN

According to Good, one of the purposes of the survey investigation is "to secure evidence concerning the existing situation or current condition."[1] Whitney added to the fact-finding nature of the descriptive survey the quality of adequate interpretation.[2] Because this study was intended to assess the current incidence of catheterization in postoperative care and also to interpret this incidence, the descriptive survey method was chosen for the study.

The first step taken was the review of pertinent literature. This review served a two-fold purpose of providing a basis of comparison for this study and suggesting ways of analyzing and classifying the data obtained.

II. RATIONALE FOR THE HOSPITAL SELECTION PROCEDURE

The two hospitals selected for the study were the Loma Linda Sanitarium and Hospital, or Hospital A, in Loma Linda, and the White Memorial Hospital, or Hospital B, in Los Angeles. Both were located in Southern California, separated by sixty miles. Both hospitals were owned and operated by the Seventh-day Adventist denomination and were

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[1]Carter V. Good, Introduction to Educational Research (New York: Appleton-Century-Crofts, Inc., 1959), p. 167.

[2]Frederick L. Whitney, The Elements of Research (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1950), p. 160.

part of the organizational structure of the Loma Linda University. Because of this, it was felt that the general philosophy and purpose of the two institutions would be very similar thus eliminating one distractor from the study results.

There also existed several dissimilarities which were considered essential to the study. Hospital A was a 170 bed hospital in a small community. Although connected with the university, the hospital was used only for such clinical education of medical students as was provided in the sophomore year; however, it was utilized extensively in the program of the school of nursing which the university conducts. This connection was presumed to foster a practice of medicine and nursing which was typical of the best currently found in the small community hospital.

On the other hand, Hospital B, a 308 bed hospital, was used for the clinical education of junior and senior medical students, interns and residents. It therefore had a large clinic patient clientele. Because of the hospital's connection with an A rated medical school, the practice of medicine in the institution could be considered representative of that to be found in the large medical centers.

Although it would have been interesting to do so, the limitations of time and finance prevented inclusion in the study of a third hospital that was typical of the small, rural health facility.

Permission to conduct the study in their hospital was granted by the respective hospital administrators.

III. SOURCE AND COLLECTION OF THE DATA

The survey was conducted retrospectively using the patient

hospital record as the source of data. The primary reason for this approach was one of time saving. It was assumed that the incidence of catheterization postoperatively could be adequately and validly obtained from the hospital record because the procedure was one which would seldom go unrecorded by the nursing personnel. Nelson, in her study of the characteristics of nurses' notes, appeared to support this assumption.[3]

The study was conducted on the records of those patients who had surgery between October 1, 1961, and December 31, 1961. This period of time was selected for three reasons. (1) Most hospital record libraries issue a quarterly summary of hospital patients by service, (2) the records were as recent as possible, and (3) they would be more likely to be completed and filed in the record room thus being available for the study. Only the third of the reasons was found to be subject to question since it was often difficult to trace individual records to their various stages and places of completion.

IV. SELECTION OF CRITERIA FOR INCLUSION OF PATIENTS IN THE STUDY

The writings of several contemporary authorities and the results of several earlier studies were used as an aid in identifying the criteria for qualifying patients for inclusion in the study.

All patients over eighteen years of age were included in the study unless they were subject to one or more of the disqualifying criteria.

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[3]Mildred Evelyn Nelson, "A Study of Nursing Care Notes with Respect to Certain Criteria," unpublished Master's thesis, College of Medical Evangelists, Loma Linda, California, 1958, p. 45.

1. Patients under eighteen years of age were not included in the study because of the conclusion of Mills that postoperative urinary retention is seldom found in this age group.[4]

2. Patients with surgery of the genito-urinary tract were eliminated from the study because of the obvious interference with normal urinary function.

3. Patients undergoing obstetrical surgery were also eliminated from the study because of the effect of pregnancy on the normal bladder function and the techniques of surgery usually employed.

4. Patients who had reconstructive vaginal surgery were also disqualified because of the necessity of retention catheterization.[5]

5. Patients having surgery under local anesthesia were not included in the study because of the finding of Jordan that retention is rare in these patients.[6]

V. METHOD OF SECURING PATIENT HOSPITAL RECORDS

The two hospitals differed in the procedure used for the procurement of the patient's record. In Hospital A the operating room record of cases was reviewed for the selected time period to obtain the names and hospital numbers of the patients who had surgery. Since the patients were listed in this book by their names, numbers and type of operation, it was possible to eliminate some from the study in this

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[4]Mills, op. cit., p. 185.

[5]George L. Sexton, "Urinary Tract Infection Following Use of Indwelling Catheters," Obstetrics and Gynecology, 17:741, June, 1961.

[6]Jordan, op. cit., p. 127.

step. The records were then "pulled" by the writer from the record stacks and reviewed individually. The rest of the qualifying criteria were applied at that time. It is evident that the procedure resulted in a certain amount of wasted time and effort.

In Hospital B the names and numbers of those patients who were eligible for the study were obtained from the records of the department of anesthesia. Separate types of records are kept for those patients having surgery under local anesthesia and those under general anesthesia and thus it was possible to eliminate one group at the outset. The records were of the key punch classification type which means that information was keyed by number and the corresponding number was punched out to indicate the presence of a certain characterestic. All patients who possessed a certain characteristic were selected from the entire group by passing an ice pick through the area numbered to correspond to the characteristic. Those so keyed then shook out of the group easily. Since age, sex, type of operation and type of anesthesia were keyed on the form it was possible to eliminate most of the patients who did not qualify for the study without having to review the entire group's records. A few patients were found during the individual record review who did not qualify because it was necessary to include patients from fifteen to seventeen years of age during the elimination process since the key extended from fifteen to twenty years. Also a few of the types of operations were keyed by the operation that was originally intended not indicating the event of additional surgery of the type that would disqualify for the study.

The names and numbers of the patients who were eligible for the study were placed on special request forms and given to the record

librarian who then supplied the records. It is readily apparent that the record review was accomplished much more expeditiously in Hospital B than A.

VI. CLASSIFYING AND ANALYZING THE DATA

A check sheet was designed on which the individual patient record number could be recorded in the event it became necessary to recheck work.

The form was designed with a place for a check mark under the proper classification by sex, marital status, age, type of operation, type and length of anesthesia, type of bladder evacuation whether voluntary or by intermittent catheterization or retention catheterization, length of time from the end of anesthesia to the time of the first post-operative evacuation and the amount of urine evacuated or withdrawn.

The final steps of the study were the analysis of data and comparison of the data with several of the earlier studies of this subject.

VII. SUMMARY

This descriptive survey was conducted retrospectively. The patients' hospital records were the source of data.

Two hospitals were selected for study because of their similarities of purpose, control and university affiliation. Their dissimilarities of size and relative numbers of private and clinic patients were also considered as assets in the study.

Patients were not included in the study who had one or more of the following characteristics: (1) were under eighteen years of age,

(2) had surgery of the genito-urinary tract, (3) had vaginal plastic repair, (4) had obstetrical surgery, or (5) had local anesthesia only.

The patient records were reviewed for information regarding the relationship of the method of postoperative bladder evacuation to various factors such as age, sex, marital status, admission status, type of operation, and type and length of anesthesia.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

I. INTRODUCTION

The purposes of this descriptive survey were to (1) find out if the incidence of bladder infection could be reduced by decreasing the number of postoperative catheterizations, (2) find out what the incidence of current methods of postoperative bladder evacuation were, (3) find out if and what changes had occurred in the incidence of the methods of bladder evacuation since the publication of previous studies, and (4) discover the current relationships of the methods of bladder evacuation to various factors such as age, sex, marital status, admission status, type of operation, and type and length of anesthesia.

II. SETTING AND POPULATION OF THE STUDY

The study was conducted retrospectively on the hospital records of patients who had surgery between October 1, 1961, and December 31, 1961. The hospitals were selected for their similarities of purpose, control, and affiliation with a recognized school of medicine. Dissimilarities of size and relative numbers of private and clinic patients were also considered during the selection of hospitals.

The patients who were studied during this time period included all who (1) were over eighteen years of age, (2) had not had genitourinary surgery, vaginal plastic repairs, or obstetrical surgery, and (3) had general anesthesia.

It was not one of the original intents of this study to compare

the incidences of method of postoperative bladder evacuation in the two hospitals used in the survey. However, during the process of data tabulation a recognizable difference did appear in the general incidences of the three methods of bladder evacuation in the two hospitals. A chi square test was performed on the data. The result of the test showed there was only one chance in 10,000 that the differences noted were due to sampling error.

Because of the significance of this difference in results between the two hospitals the areas where the differences occurred were also tabulated separately and contrasted in the presentation of data.

Of the 1045 patients who were eligible for the study, ten were not included because of the unavailability of their hospital records.

In Hospital A, of the 392 patients eligible for the study, 388 were included. Four patient records were unavailable for review. In Hospital B, 647 of the 653 eligible patients were included in the study. The remaining six records were also unavailable. Males comprised only 33 per cent of the total study population. In Hospital A, 31.7 per cent of the patients studied were men; 33.4 per cent were men in Hospital B.

The distribution of the population of the study by the type of surgery performed is summarized in Table I. Although gynecological and abdominal surgeries accounted for 33.6 per cent of the total number of surgeries, it accounted for 44.5 per cent of the surgery in Hospital A and 37.8 per cent in Hospital B. The high incidence of gynecological surgery was understandable in view of the predominence of females in the study.

TABLE I

DISTRIBUTION OF CASES BY TYPE OF SURGERY

HOSPITAL	TYPE OF SURGERY																	
	Neuro.		Head-Neck		Chest		Extrem.		Gynecol.		D & C		Abdomin.		Inguinal		Integu.		Rectal		Diagnos.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	11	2.8	26	6.8	6	1.8	49	12.6	60	15.5	23	6.0	90	23.0	42	10.8	46	11.8	25	6.5	9	2.5
B	29	4.4	72	11.0	37	5.6	88	13.6	86	13.2	50	7.6	110	17.0	30	4.8	51	8.0	38	6.0	57	8.8
TOTALS	40	3.9	98	9.5	43	4.0	137	13.2	146	14.3	73	7.0	200	19.3	72	7.0	97	9.4	63	6.1	66	6.3

The occurrence of neurological, head-neck, chest and diagnostic surgeries was 2 to 6 per cent lower in Hospital A than in Hospital B.

III. THE INCIDENCE OF INCOMPLETE RECORDS IN THE TWO HOSPITALS

Out of the 1035 records reviewed, only eight failed to report the method by which postoperative bladder evacuation occurred. Since all eight records were found in Hospital B this resulted in elimination of 1.2 per cent of that hospital's qualifying patients from the study. According to Table II the area of most frequent omission was that of the amount of urine obtained in the first postoperative bladder evacuation. This omission occurred in the case of voluntary voidings only. The omission of time of voiding was also limited to voluntary voidings. These omissions occurred most frequently in cases of dilation and curettage and in diagnostic procedures. It thus appeared that the assumption that the procedure of catheterization was seldom unrecorded was well supported.

IV. COMPARISON OF THE INCIDENCE OF THE THREE METHODS OF POSTOPERATIVE BLADDER EVACUATION

As is indicated in Table III the number of patients who voided voluntarily was 638, or 61.6 per cent of the total study population. Intermittent catheterization occurred in 128 or 12.4 per cent of the total group, while retention catheterization accounted for the remaining 269 or 26.0 per cent.

The number of patients who voided voluntarily in Hospital B was 4.2 per cent higher than in Hospital A. The number of patients who

TABLE II

COMPARISON OF UNRECORDED INFORMATION IN HOSPITALS A AND B

Item of Unrecorded Information	Hospital A		Hospital B		Total A and B	
	No.	%	No.	%	No.	%
Method of Voiding	0	0	8	1.2	8	1.2
Time of First Voluntary Voiding	21	5.4	56	8.6	77	7.4
Amount of Urine Voided Voluntarily	114	31.0	177	27.4	291	28.1

had intermittent catheterizations was 4.1 per cent higher in Hospital B than A. These higher incidences were balanced, however, by the fact that the incidence of retention catheterization was 8.3 per cent higher in Hospital A than in Hospital B. In both hospitals catheterization of both types accounted for more than one-third of the postoperative bladder evacuations.

V. THE INFLUENCE OF TYPE OF SURGERY ON THE METHOD OF POSTOPERATIVE BLADDER EVACUATION

Figure 1 illustrates the relationship between the anatomical location of the surgery and the method of postoperative bladder evacuation. The highest incidence of voluntary voidings occurred in surgeries of the head-neck region and diagnostic procedures. Neurological and rectal surgeries accounted for the highest percentage of intermittent catheterizations. The 42.5 per cent incidence of retention in neurological surgeries was influenced by the 100 per cent occurrence of retention catheterization for the eleven neurological surgical patients in Hospital A. There was a 68.5 per cent incidence of retention catheterization after gynecological surgery. In Hospital A, the 72 per cent incidence of retention catheterization for gynecological surgery was based on 60 cases which resulted in the catheterization of 43 persons. The highest incidence of retention catheterization in Hospital B, 66 per cent, was found in gynecological surgical patients. The hysterectomies included under the classification of gynecological surgery had a 100 per cent incidence of retention catheterization in Hospital A and a 95 per cent incidence in Hospital B.

TABLE III

INCIDENCE OF POSTOPERATIVE METHODS OF BLADDER EVACUATION

HOSPITAL	Number Voluntary Voidings	Per cent Voluntary Voidings	Number Intermittent Catheter	Per cent Intermittent Catheter	Number Retention Catheter	Per cent Retention Catheter
A	229	59.0	39	9.7	120	31.3
B	409	63.2	89	13.8	149	23.0
TOTAL A & B	638	61.6	128	12.4	269	26.0

Intermittent catheterization occurred after 20.5 per cent of the abdominal surgeries in the study.

The 18 per cent incidence of intermittent catheterization for abdominal surgeries in Hospital A is equal to, and the 22 per cent incidence in Hospital B is approximately 4 per cent greater than, the 18.6 per cent incidence reported by Jordan[1] and the 18.3 per cent reported by Treiger.[2]

VI. INFLUENCES OF TYPE AND LENGTH OF ANESTHESIA ON THE METHOD OF POSTOPERATIVE BLADDER EVACUATION

The data in Figure 2 shows that mixed inhalation anesthesia was the most frequently used type. The mixture consisted of varying proportions of fluothene and nitrous oxide. Cyclopropane was added to the mixture in a total of 24.8 per cent of the cases, 33 per cent in Hospital A and 5 per cent in Hospital B. Intravenous pentobarbital was used with the inhalation anesthesia in 99 per cent of the anesthesias in both hospitals.

Although spinal anesthesia was used in 13.6 per cent of the total study population there was a marked difference in usage between the two hospitals. Spinal anesthesia accounted for only 2 per cent of the cases in Hospital A and 18 per cent in Hospital B. This incidence was markedly lower in Hospital A than the 17.4 per cent reported by Jordan.[3]

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[1]Claus G. Jordan, "Postoperative Urinary Retention," Annals of Surgery, 98:125, January, 1933.

[2]Phillip Treiger, et. al., "Physiopsychologic Treatment for Postoperative Urinary Retention," American Journal of Surgery, 80:195-197, August, 1950.

[3]Jordan, loc. cit.

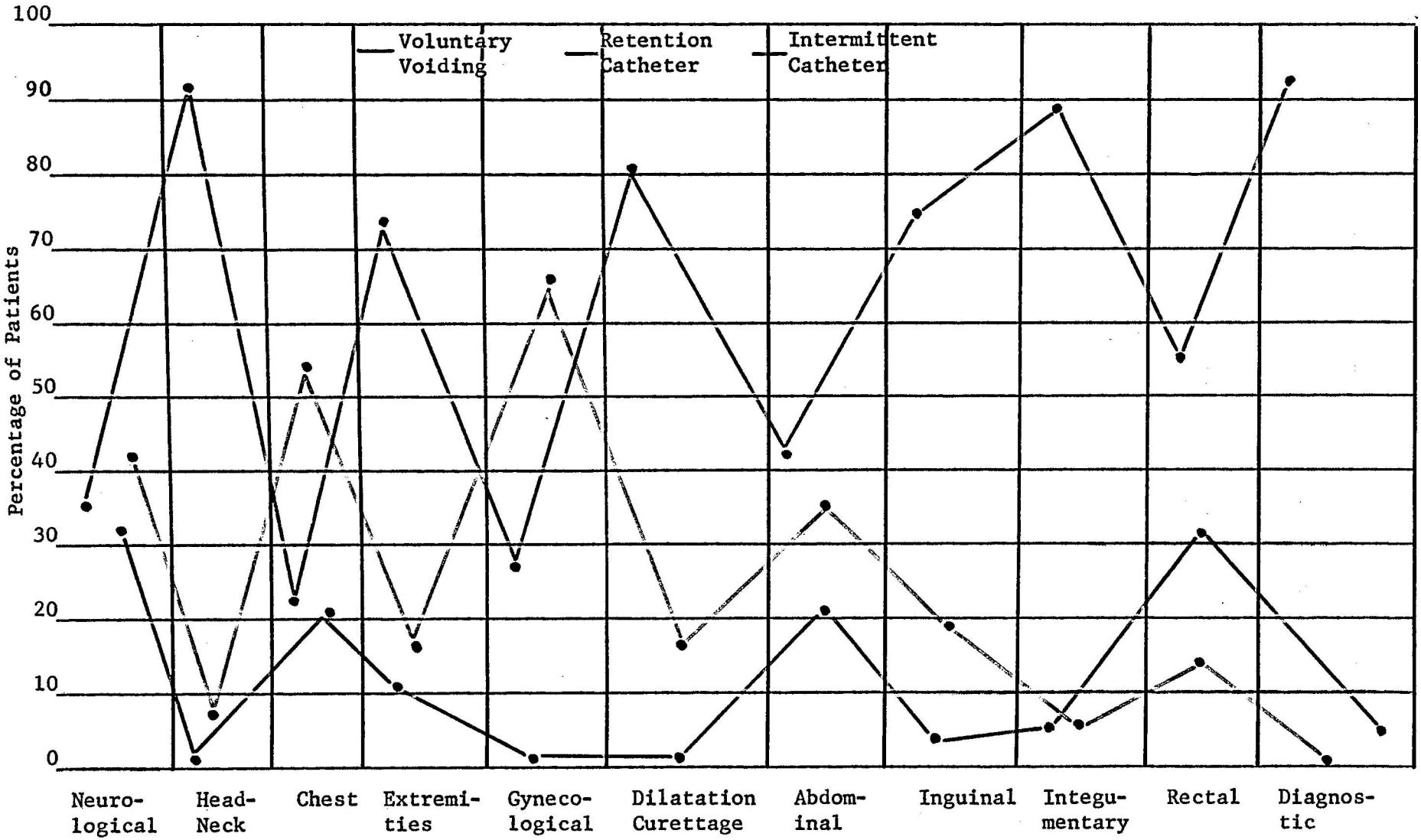

FIGURE 1

INCIDENCE OF METHOD OF POSTOPERATIVE BLADDER EVACUATION BY TYPE OF SURGERY

Although pentobarbital was used in almost 100 per cent of the cases of mixed inhalation anesthesia, it was used alone in only 1.0 per cent of the total surgeries and in only 3 per cent of the cases in Hospital A. Spinal anesthesia was used in only one case in Hospital B.

The "other" anesthetic listed in Figure 2 represents various area blocks including a predominence of caudal anesthesias. These types of anesthesia were not reported in earlier studies of postoperative voiding.

Figure 3 illustrates a marked comparability of the influence of anesthetic agent on the method of bladder evacuation in the two hospitals. The 26.2 per cent incidence of intermittent catheterization following spinal anesthesia was surprisingly high and appears to support Mills' conclusion that spinal anesthesia tends to interfere with re-establishment of the voiding reflex.[4] The 33.3 per cent incidence of retention following caudal and other regional blocks indicated by Figure 3 was noteworthy.

The data in Table IV indicates a direct relationship between the length of anesthesia and incidence of urinary retention. The highest incidence of voluntary voiding, 80.6 per cent, occurred in those patients who were under anesthesia only one hour, while the highest incidence of intermittent catheterization and retention catheterization, 55.9 and 23.5 respectively, occurred after six or more hours of anesthesia. Following six or more hours of anesthesia only 20.6 per cent of the patients voided voluntarily. It was surprising to note that, this being

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[4]R. G. Mills, "The Incidence of Postoperative Catheterization in the John Hopkins Hospital," Annals of Surgery, 99:813-839, June, 1924.

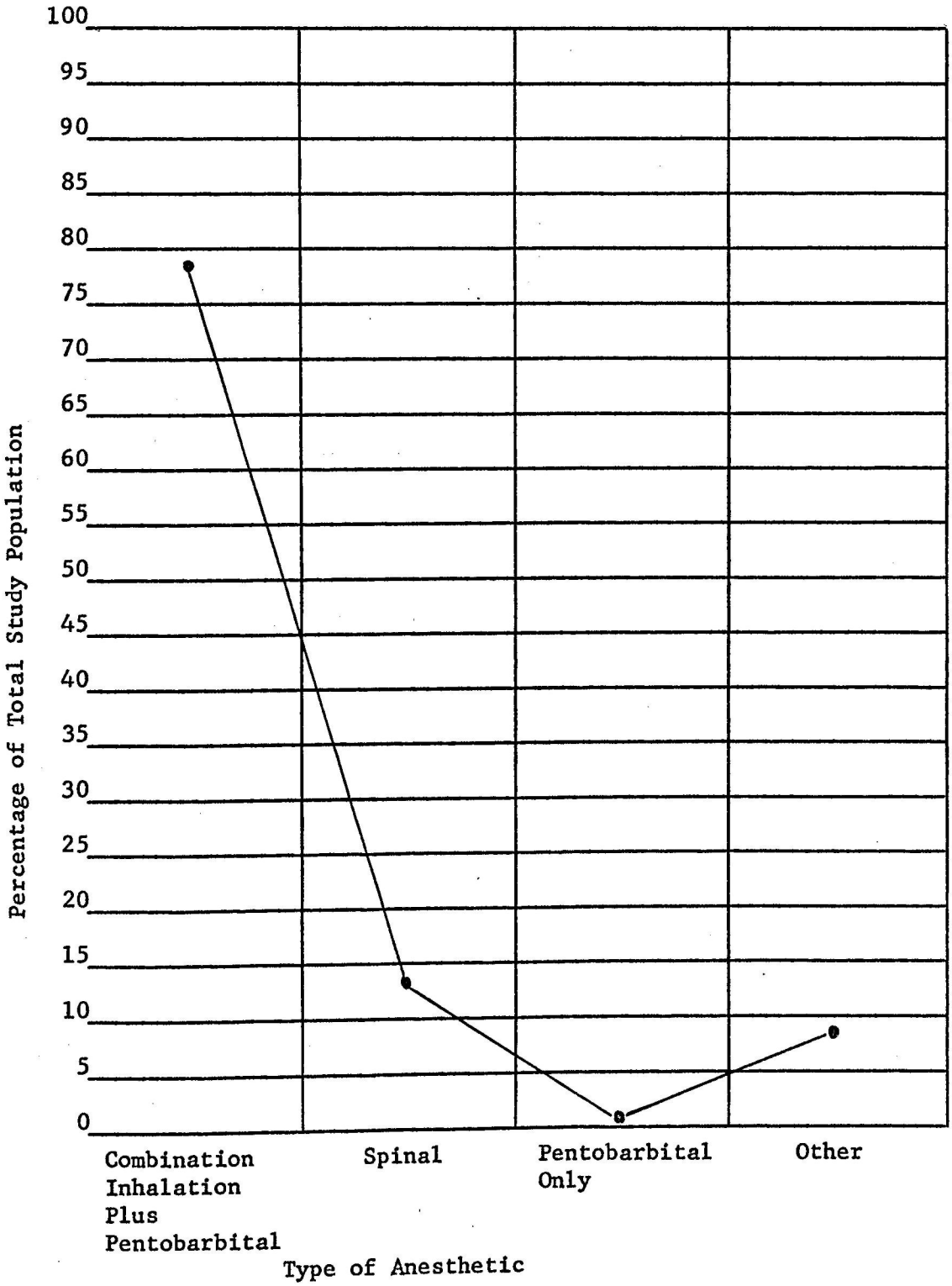

FIGURE 2

DISTRIBUTION OF STUDY POPULATION BY TYPE OF ANESTHETIC

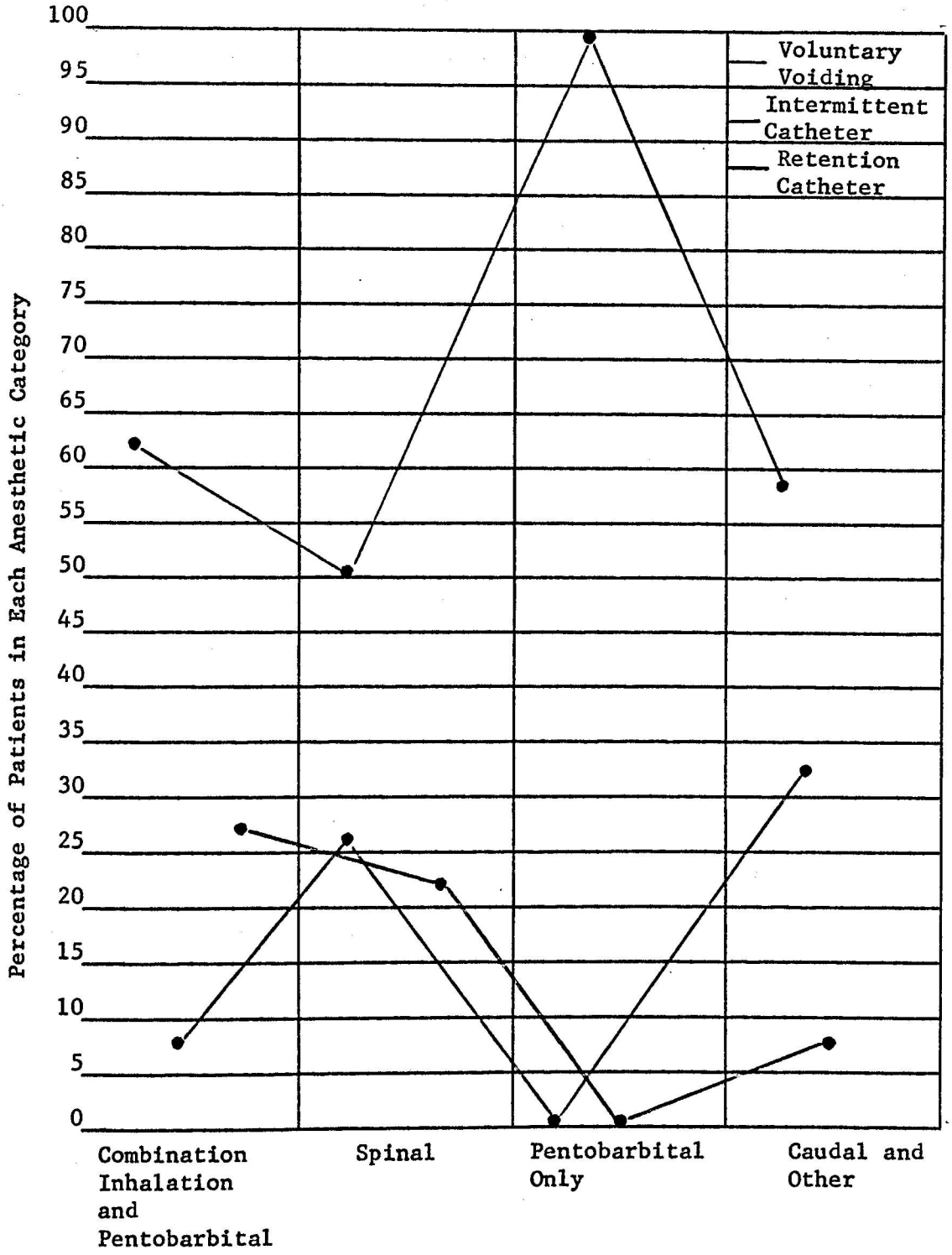

FIGURE 3

METHODS OF POSTOPERATIVE BLADDER EVACUATION BY ANESTHETIC AGENT

true, the incidence of retention catheterization to prevent retention was highest in the one- and two-hour groups in Hospital A, the time in which one would expect the retention problem to be least. In Hospital B the retention catheter was used most frequently in the two- to four-hour groups. In Hospital A, catheterization of both types combined occurred in 100 per cent of the cases six or more hours in length. In Hospital B, 23 per cent of these patients voided voluntarily.

VIII. RELATIONSHIP OF TIME TO NUMBER OF PATIENTS VOIDING VOLUNTARILY

As Figure 4 indicates, 75 per cent of the voluntary voidings occurred within twelve hours of surgery. Seventh-three per cent of the patients in Hospital A and 60 per cent of the patients in Hospital B that voided voluntarily did so within ten hours after surgery. Voluntary voiding sixteen or more hours after surgery occurred in a total of 6.5 per cent of the cases.

Sixty-five per cent of the intermittent catheterizations were performed between six and ten hours following surgery with an average amount of 307 c.c. of urine being withdrawn. The range of amounts went from 100 c.c. to 1000 c.c. in this time period but these extremes accounted for less than 1.0 per cent of the patients studied. Guyton, Tuttle and Schottelius in their discussions of bladder physiology stated that 250 to 300 c.c. of urine must be present in the bladder before the micturition reflex is initiated.[5] This gave cause for concern

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[5]Arthur C. Guyton, Textbook of Medical Physiology (Philadelphia: W. B. Saunders Company, 1961), p. 137; and W. W. Tuttle and Byron A. Schottelius, Textbook of Physiology (St. Louis: C. V. Mosby Company, 1961), p. 398.

TABLE IV

RELATIONSHIP OF LENGTH OF ANESTHESIA TO POSTOPERATIVE BLADDER EVACUATION

Hours	HOSPITAL A			HOSPITAL B			TOTALS		
	Retention Catheter	Intermittent Catheter	Voluntary Voiding	Retention Catheter	Intermittent Catheter	Voluntary Voiding	Retention Catheter	Intermittent Catheter	Voluntary Voiding
1	13	17	124	18	28	193	31	45	317
	9%	11%	80%	9%	11%	80%	8.0	11.4	80.6
2	17	44	76	35	35	120	52	79	196
	11%	32%	57%	18%	18%	64%	15.8	24.2	60.0
3	4	40	31	18	37	49	22	77	80
	6%	53%	41%	17%	36%	47%	22.4	43.0	44.6
4	1	2	2	10	23	32	11	25	34
	8%	77%	15%	16%	35%	49%	15.8	35.7	48.5
5	1	4	0	2	9	8	3	13	8
	20%	80%	0	11%	47%	42%	12.5	54.2	33.3
6 +	2	2	0	6	17	7	8	19	7
	50%	50%	0	20%	57%	23%	23.5	55.9	20.6

as to the necessity for many of the intermittent catheterizations performed since the amount of urine withdrawn was only an average of 307 c.c.

The amount of urine most frequently voided voluntarily was 300 c.c., accounting for 32 per cent of the cases. Less than 5 per cent of the cases fell in each of the amounts between 600 and 1000 c.c. This was comparable to the results of the studies by Mills and Treiger.[6] These figures are graphed in Figure 5.

Table V shows that the number of patients voiding, or being catheterized, after fourteen hours were few. Perhaps it was because of this that a trend toward amounts of urine being higher was not clearly established. The numerical average of amounts of urine voided or withdrawn did rise in relation to the rise in length of time until voiding. The average was 440 c.c. at fourteen hours and 630 c.c. at twenty-two hours. The average then dropped back to 370 c.c. at 24 hours.

Less than 7 per cent of the patients voided, or were catheterized, more than 14 hours postoperatively and only 17 per cent voided more than 500 c.c. of urine.

IX. THE RELATIONSHIP OF AGE TO POSTOPERATIVE METHODS OF BLADDER EVACUATION

As is shown in Figure 6, there was a relationship between age and postoperative retention of urine. The oldest group had the fewest voluntary voidings and the most retention catheterizations. The

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[6]Mills, loc. cit.; and Treiger, et. al., loc. cit.

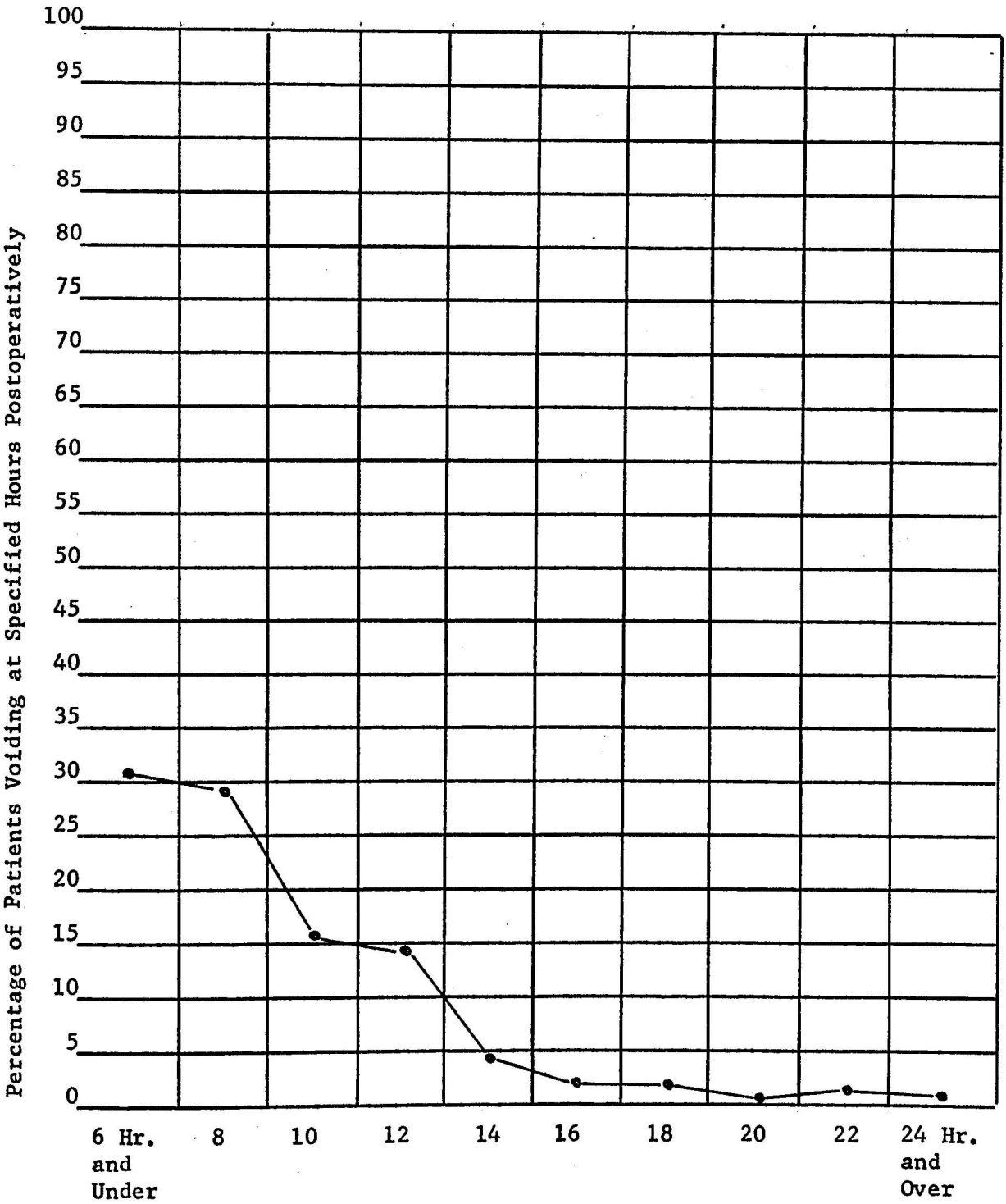

FIGURE 4

RELATIONSHIP OF TIME TO VOLUNTARY VOIDING

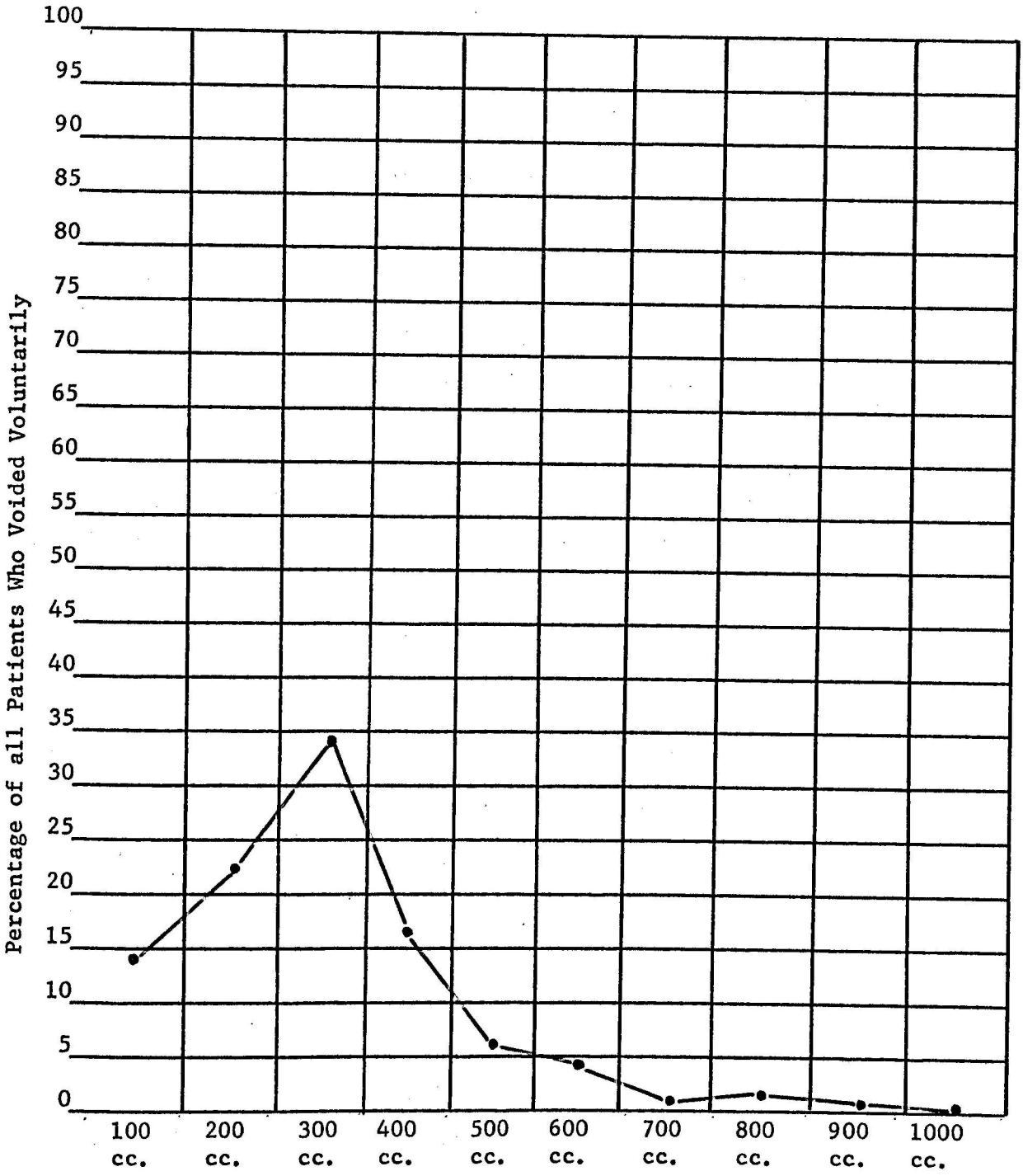

FIGURE 5

INCIDENCE OF AMOUNTS OF URINE VOIDED VOLUNTARILY

TABLE V

RELATIONSHIP OF TIME OF BLADDER EVACUATION TO AMOUNT OF URINE OBTAINED INDICATED BY NUMBERS OF PATIENTS

Number of Hours Postanesthesia	100 and Less	200	300	400	500	600	700	800	900	1000 and Over
24	1	0	1	1	0	1	0	1	0	1
22	0	0	0	1	1	0	0	0	0	1
20	0	0	0	0	3	0	0	0	0	0
18	0	1	0	1	1	4	1	0	0	0
16	0	2	1	1	2	0	0	0	1	1
14	1	0	4	4	1	2	2	0	0	0
12	1	13	20	12	7	5	1	2	1	2
10	7	12	22	16	9	3	3	1	0	2
8	13	22	43	18	2	4	3	5	2	2
6	21	33	44	17	7	3	3	0	2	1

Amounts of Urine in Cubic Centimeters

youngest group was an exact opposite. The 56-65 year-old group interrupted a steady decline in voluntary voidings with a 6 to 8 per cent increase in number in Hospitals A and B respectively. The picture on the whole was one of direct relationship of increase in age to increase in urinary retention.

X. THE INFLUENCE OF SEX AND MARITAL STATUS ON METHOD OF POSTOPERATIVE BLADDER EVACUATION

Influence of Sex

The per cent of voluntary voidings by the males in both hospitals were within 1.0 per cent of each other. In Hospital B, 6 per cent more of the females voided voluntarily. Table VI illustrates that the intermittent and retention catheterization were in inverse ratio in both males and females. The retention catheter was employed 7.6 per cent more frequently in females than males and 9 per cent more frequently on the females of Hospital A and 7 per cent more frequently on females of Hospital B. When the high percentage of gynecological operations in this series was considered, this fact was not surprising. The result did appear to support the conclusion of earlier studies in which females were more prone to develop retention. However, the preponderance of females and gynecological surgery in this study would leave room for question in such a conclusion.

Influence of Marital Status

The data in Figure 7 showed no dramatic relationship between marital status and method of bladder evacuation, although there was a sharp decline in voluntary voidings between the separated and widowed groups. This could have been considered the result of age rather than marital status, since most widowed persons were in the

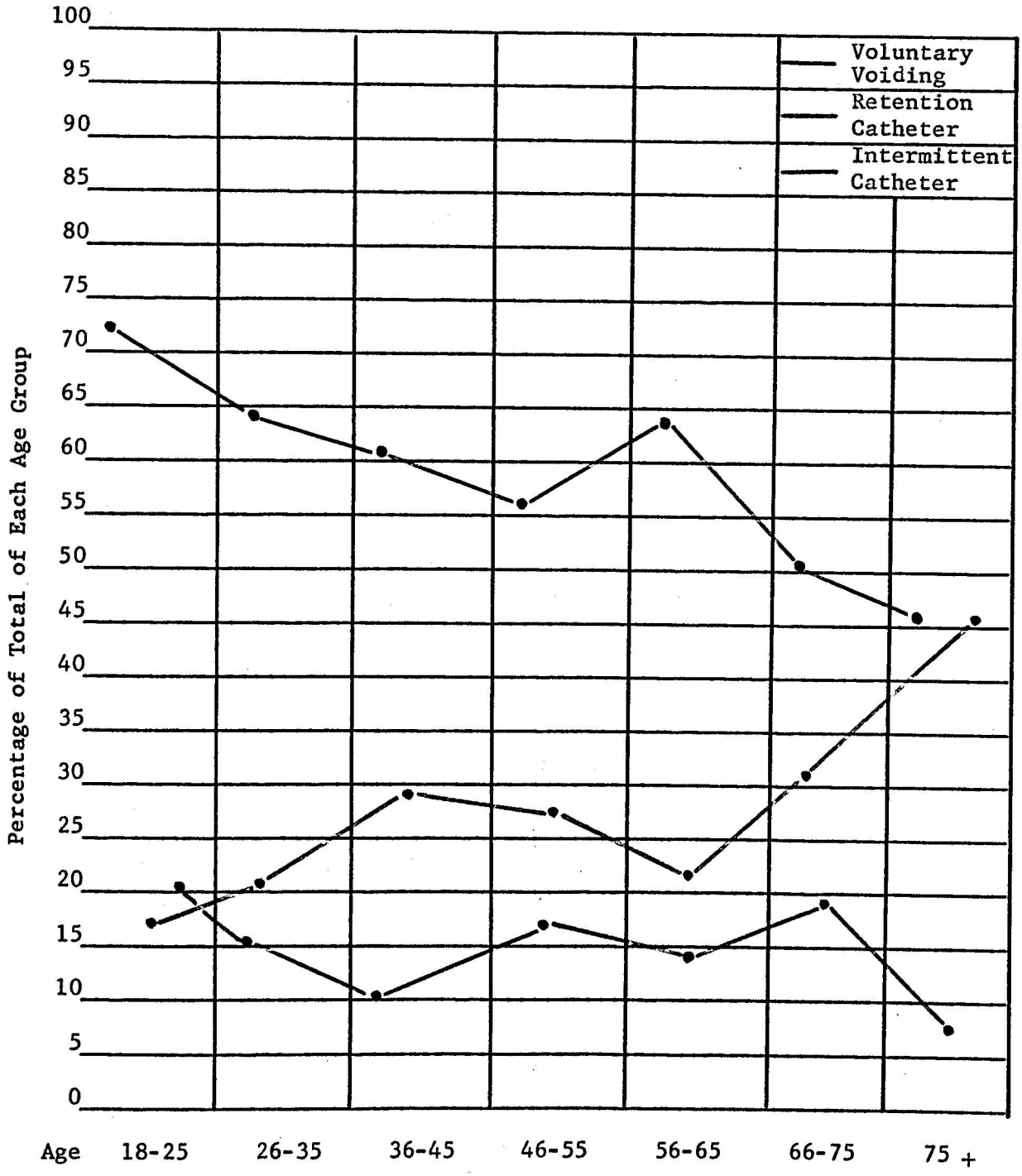

FIGURE 6

INFLUENCE OF AGE UPON METHOD OF POSTOPERATIVE BLADDER EVACUATION

TABLE VI

INFLUENCE OF SEX ON METHODS OF POSTOPERATIVE BLADDER EVACUATION

HOSPITALS	M A L E						F E M A L E					
	Voluntary Voiding		Intermittent Catheter		Retention Catheter		Voluntary Voiding		Intermittent Catheter		Retention Catheter	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	79	64	14	11	30	25	150	57	34	9	90	34
B	137	63	39	20	40	18	272	63	50	12	109	25
TOTALS A & B	216	63.7	53	15.7	70	20.6	422	60.0	84	11.8	199	28.2

older age group.

Figure 8 pointed up a much more impressive influence of sex and marital status combined on intermittent catheterization than marital status alone. The dissimilarities in the figures in both hospitals were negligible.

It was interesting to note the 5 per cent higher incidence of retention in married males than in married females as seen in Table VI. This occurrence was in opposition to the findings of Mills as is illustrated in Table VII. The findings of this study did support his conclusion that married females were more likely to have retention than single females but the same was found to be true of males.[7] The fact that marriage appeared to result in higher incidences of urinary retention in both sexes seemed to give stronger support to Mills' theory that the sexual relations of marriage have a causative effect on retention than does a high incidence in females only.

XI. THE INFLUENCE OF ADMISSION STATUS ON METHOD OF POSTOPERATIVE BLADDER EVACUATION

Table VIII shows a surprising reversal of the conclusions of Treiger and Jordan, who indicated in their studies that the private patient tended to have retention more frequently than the clinic patient.[8]

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[7]Mills, op. cit., p. 836.

[8]Treiger, et. al., op. cit., p. 196; and Jordan, op. cit., p. 127.

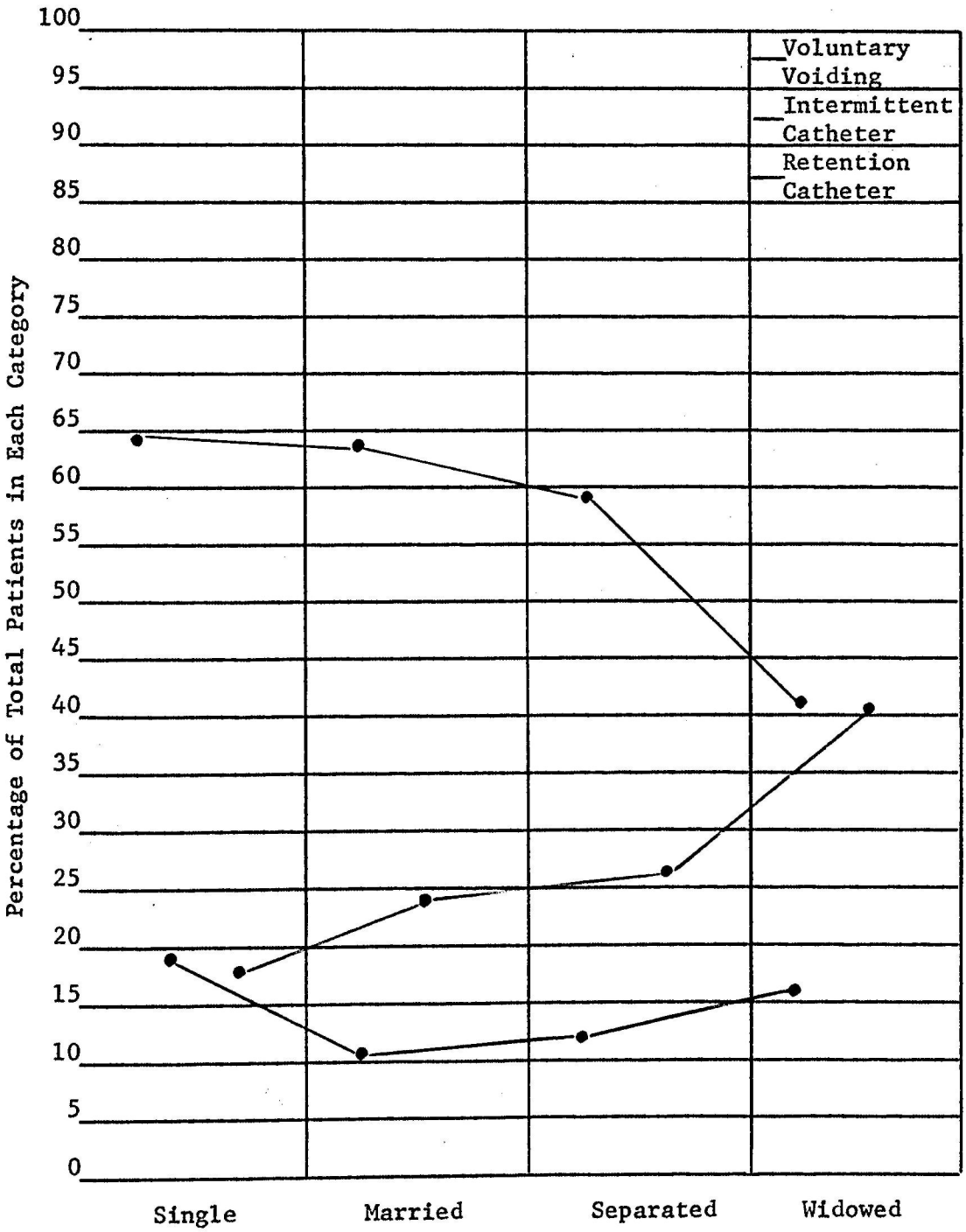

FIGURE 7

INFLUENCE OF MARITAL STATUS ON METHOD OF POSTOPERATIVE BLADDER EVACUATION

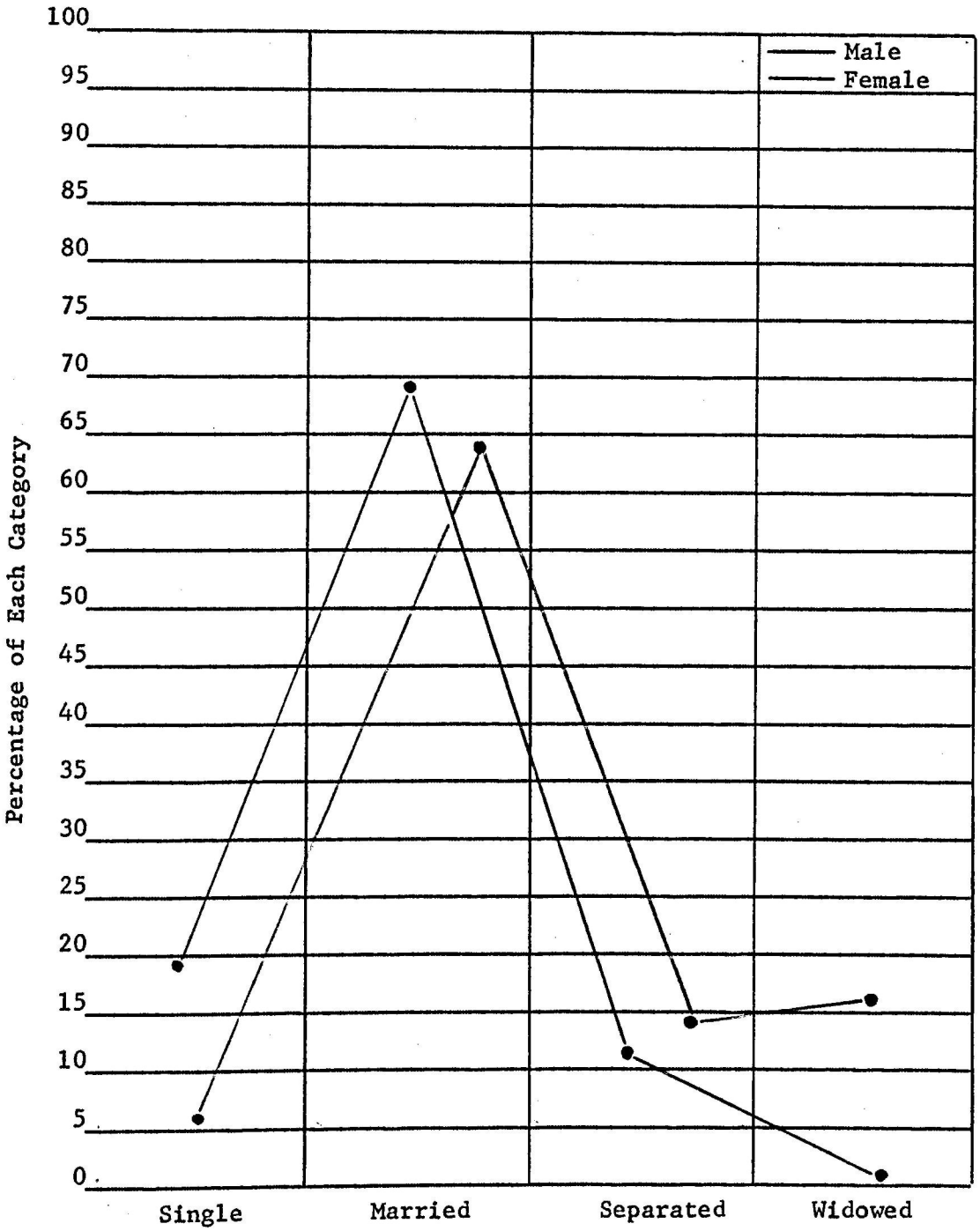

FIGURE 8

INFLUENCE OF SEX AND MARITAL STATUS
ON INTERMITTENT CATHETERIZATION

TABLE VII

COMPARISON OF INFLUENCE OF SEX AND MARITAL STATUS ON POSTOPERATIVE INTERMITTENT CATHETERIZATION IN TWO STUDIES

Sex	Marital Status	John Hopkin's Hospital	Hospitals A and B
MALE	Single	2.1%	4.0%
	Married	3.1%	16.4%
	Separated	. . .	2.8%
	Widowed	. . .	0.4%
	Total (Male)	5.2%	23.6%
FEMALE	Single	9.7%	0.9%
	Married	23.1%	9.9%
	Separated	. . .	2.1%
	Widowed	. . .	2.4%
	Total (Female)	32.8%	15.3%

TABLE VIII

INFLUENCE OF ADMISSION STATUS ON METHODS OF POSTOPERATIVE BLADDER EVACUATION

HOSPITALS	CLINIC PATIENTS						PATIENTS PRIVATE					
	Voluntary Voiding		Intermittent Catheter		Retention Catheter		Voluntary Voiding		Intermittent Catheter		Retention Catheter	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	15	54	3	10	10	36	216	60	35	10	109	30
B	166	60	39	14	72	26	243	65	50	14	77	21
TOTALS A & B	181	59.3	42	13.8	82	26.9	459	62.9	85	14.4	186	22.7

This study revealed a 4.2 per cent greater incidence of retention among clinic patients than among private patients. There was a 6 per cent greater incidence of retention in Hospital A's clinic patients and a 5 per cent greater incidence in Hospital B's clinic patients than in either hospital's private patients.

XII. COMPARISON OF INCIDENCE OF RETENTION WITH PREVIOUS STUDIES

Table IX reveals the incidence of intermittent catheterization in this study to be lower than those reported in the studies used for comparison. However, although in Hospital A the incidence was lower than the three previous studies of Jordan, Treiger and Mills, the incidence in Hospital B was higher than in these three studies.[9] The occurrence of retention catheterization in Hospital A and B was just the reverse, being higher in A. Previous studies had not included the incidence of retention catheterization and therefore afforded no basis for comparison.

XIII. SUMMARY

Voluntary voiding was found to occur in 59 per cent of the patients of Hospital A and in 63.2 per cent of the patients of Hospital B. Intermittent catheterization occurred among 9.7 per cent of the cases in Hospital A and 13.8 per cent in Hospital B. The remaining 31.3 per cent of the surgical patients in Hospital A and

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[9] Jordan, op. cit., p. 127; Trieger, et. al., op. cit., p. 198; and Mills, op. cit., p. 817.

TABLE IX

COMPARISON OF INCIDENCE OF INTERMITTENT CATHETERIZATION IN FOUR STUDIES

TYPE OF OPERATION	Jordan's Study	Mill's* Study	Treiger's Study	Hospital A	Hospital B	Total
Abdominal	21.4%	13.1%	12.7%	17.0%	23.0%	20.5%
Hernia	15.7%	3.8%	25.0%	12.0%	29.0%	19.2%
Rectal	14.3%	12.9%	. . . .	28.0%	42.0%	36.5%
Extremities	0.0%	1.5%	. . . .	6.0%	12.0%	10.2%
Chest	6.5%	. . . .	. . . .	29.0%	19.0%	20.5%
Head and Neck	3.0%	2.0%	. . . .	8.0%	0.0%	2.0%
Gynecological	20.0%	26.4%	. . . .	3.0%	2.0%	2.7%
Total Incidence Reported	11.9%	12.38%	18.3%	11.0%	20.0%	11.2%

*Figures not available.

23 per cent in Hospital B were subject to retention catheterization postoperatively.

The highest incidence of voluntary voiding in both hospitals occurred in patients having head-neck, integumentary and diagnostic surgeries. The event of intermittent catheterization occurred most frequently following rectal surgery in both hospitals. The greatest number of patients with retention catheters and a common surgery were found in the gynecological classification.

Age, sex, marital status, admission status, type and length of anesthesia were all found to have an influence on the method of postoperative bladder evacuation.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

I. SUMMARY

The purposes of this descriptive survey were to (1) find out if the incidence of bladder infection could be reduced by decreasing the number of postoperative catheterizations, (2) find out what the incidence of current methods of postoperative bladder evacuation were, (3) find out if and what changes had occurred in the incidence of the methods of bladder evacuation since the publication of previous studies, and (4) discover the current relationships of the methods of bladder evacuation to various factors such as age, sex, marital status, admission status, type of operation, and type and length of anesthesia.

Within the last decade a growing concern regarding the high incidence of bacterial invasion of the urine following catheterization had been noted. Evidence of this concern was seen in the increasing body of literature regarding the subject. One of the most frequent uses of the catheter was found in management of postoperative voiding.

Twelve years had elapsed since the publication of the latest study regarding postoperative voiding patterns found in the review of literature. In view of the many changes and improvements in surgical technique and management within that time the pertinence of the results of the previous study to the nurse and physician of today was questioned.

Frequent mention of their concern over the high incidence of postoperative catheterization on their nursing service was made by nurses in Hospital A.

In view of the lapse of time since the latest study of post-operative bladder evacuation found, the recent concern over the high incidence of bacteria following catheterization, and the concern of the nurses in Hospital A over the high incidence of postoperative catheterization in their hospital, a survey of the current situation was considered pertinent and helpful at this time.

A review of literature elicited several studies regarding the causes and prevention of postoperative urinary retention, the incidence of the use of the catheter for retention and the deleterious effects of catheterization. These studies were cited and summarized in Chapter II.

The hospital patient record was used as the source of data in two selected hospitals. The study was conducted on patients who had surgery between October 1, 1961, and December 31, 1961. All such patients were included in the study except those who (1) were under eighteen years old, (2) had genito-urinary surgery, (3) had vaginal plastic repairs, (4) had local anesthesia only, and (5) had obstetrical surgery.

The data obtained were analyzed to discover the general pattern of the methods of postoperative voiding and their relationship to various factors. The applicable data were then compared with the results of several previous studies.

The population of the study was predominantly female, with gynecological and abdominal surgeries accounting for well over one-third of the cases in both hospitals.

The incidence of voluntary voiding postoperatively was found to be approximately 60 per cent. This then meant that 41 per cent of the patients were subject to catheterization postoperatively.

Nine and seven-tenths per cent of the cases in Hospital A and 13.8 per cent of the cases in Hospital B had intermittent catheterization. The remaining 31.3 per cent in Hospital A and 23.0 per cent in Hospital B were placed on constant drainage by retention catheter.

The highest incidence of retention catheterization was the 68.6 per cent which occurred after gynecological surgery. There was a 72 per cent occurrence among the gynecological patients of Hospital A and a 68 per cent occurrence among those in Hospital B. The highest incidences of intermittent and retention catheterization occurred following neurological and rectal surgical patients, being 32.5 and 31.9 per cent respectively.

Patients having head-neck, integumentary surgeries or diagnostic procedures voided voluntarily in 91.8, 89.6 and 92.4 per cent of the cases respectively.

Since inhalation anesthesia was used for 77.1 per cent of the surgeries in this study, the incidence of method of bladder evacuation in relationship to type of anesthesia followed the general pattern just described. The analysis of the length of anesthesia in relationship to method of bladder evacuation produced an interesting outcome. One hour of anesthesia resulted in an 80.6 per cent incidence of voluntary voiding. An increase in length of anesthesia resulted in a decrease in incidence of voluntary voiding until after six hours of anesthesia the incidence was only 20.6 per cent.

Three-fourths of the patients that voided voluntarily did so between six and ten hours postoperatively. Ninety-five per cent of the patients had 500 c.c. or less urine at the time of voiding or catheterization.

The 18-25 year-old group exhibited a 73 per cent incidence of voluntary voiding. At the age of 76 and over this incidence had dropped to 46 per cent.

While the male population required intermittent catheterization more frequently, 7.6 per cent more of the females required retention catheters.

Of the males requiring intermittent catheterization, 69 per cent were married. Of the females who had intermittent catheterization, 64 per cent were wed. Clinic patients exhibited 4.2 per cent more retention than private patients.

A comparison of the data with several previous studies revealed a lower incidence of intermittent catheterization in Hospital A than previously quoted and a higher incidence in Hospital B than previously quoted.

It was interesting to note that information regarding method of bladder evacuation was recorded by the nurse in every case in Hospital A and in 98.2 per cent of the cases in Hospital B. Time and amount of evacuation were not as carefully recorded, however. The nurse failed to record time of first voiding in 5.4 per cent of the cases in Hospital A and 8.6 per cent in Hospital B. Thirty-one per cent of the records in Hospital A and 27.4 per cent in Hospital B contained no mention of amount voided.

II. CONCLUSIONS

On the basis of the data accumulated in this study the following conclusions were drawn:

1. The incidence of intermittent catheterization was lower by only 0.7 per cent in this study than in previous studies used for comparison.

2. Two-fifths of the patients who had surgery during this study faced the possibility of either intermittent or retention catheterization postoperatively.

3. This meant that four out of every ten patients who had surgery faced the possibility of urinary infection.

4. The average amount of urine withdrawn by intermittent catheterization was equivalent to the amount of urine ordinarily required to initiate the desire to void.

5. Two-thirds of the intermittent catheterizations were performed within 10 hours after surgery, a time at which the average amount of urine voided voluntarily was only 370 c.c. Perhaps this was caused by the ineffectiveness of nursing measures employed to stimulate voluntary voiding. It could also have been due to failure to employ any or the proper nursing measure to stimulate micturition. The oft written order for routine catheterization every six to eight hours if unable to void may also have acted as a deterrent to nursing initiative in the employment of measures to obviate the need for catheterization.

6. Routine catheterization every six to eight hours if unable to void proved to be unnecessary when definite signs of bladder distention were absent.

7. In relation to previous studies conducted it seemed that the 100 per cent incidence of retention catheterization of hysterectomy

patients in Hospital A and the 95 per cent in Hospital B may have been unnecessarily high. Perhaps this was due to the routine order for retention catheterization of hysterectomized patients.

8. An increase in the length of anesthesia increased the incidence of urinary retention necessitating intermittent catheterization.

9. The incidence of postoperative urinary retention was highest in patients having caudal anesthesia.

10. The incident of retention resulting in intermittent catheterization was higher in males than females. This was contrary to results of previous studies. This may have been caused by the fact that females having hysterectomies are excluded from this category by reason of the retention catheter.

11. Contrary to previous reports, the incidence of retention resulting in intermittent catheterization was higher in married males by 5 per cent than in married females. This may also have been due to exclusion of hysterectomy cases.

12. Clinic patients in this study were slightly more susceptible to retention than private patients. This was also contrary to the results of previous studies. No reason was found to explain this.

13. The procedure of intermittent catheterization was carefully and consistently recorded by nursing personnel.

14. The times and amounts of urine voided voluntarily by postoperative patients were not carefully recorded by nursing personnel.

III. RECOMMENDATIONS

On the basis of the conclusions of this study, the following recommendations were made:

1. That the study be validated by repetition in other selected hospitals of a similar type.

2. That a similar study be conducted in a hospital typical of those which are small and isolated.

3. That the order for intermittent catheterization every six to eight hours for inability to void be discontinued.

4. That intermittent catheterization be ordered on the basis of the presence of symptoms of bladder distention.

5. That study be made of the measures nurses employ to induce voluntary voiding before catheterization is performed.

6. That study be made of the relative effectiveness of the nursing measures employed to induce voluntary voiding.

7. That study be given to the development of a technique for predicting the probability of a patient's developing postoperative urinary retention.

8. That study be made of the incidence of retention in patients having hysterectomies to find out if the retention catheter is necessary as a routine preventive.

9. That inservice education programs be given in Hospitals A and B for the nursing personnel regarding the prevention and treatment of postoperative urinary retention.

10. That inservice education programs in Hospitals A and B stress the value of careful recording of time and amount of post-operative voidings.

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LOMA LINDA UNIVERSITY

Graduate School

THE INCIDENCE OF METHODS OF POSTOPERATIVE BLADDER EVACUATION

by

Joan Marie Zabady

An Abstract of a Thesis

In Partial Fulfillment of the Requirements

for the Degree of Master of Science

in the Field of Nursing

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ABSTRACT

The purposes of this descriptive survey were to (1) find out if the incidence of bladder infection could be reduced by decreasing the number of postoperative catheterizations, (2) find out what the incidence of current methods of postoperative bladder evacuation were, (3) find out if and what changes had occurred in the incidence of the methods of bladder evacuation since the publication of previous studies, and (4) discover the current relationships of the methods of bladder evacuation to various factors such as age, sex, marital status, admission status, type of operation, and type and length of anesthesia.

Need for the study was supported by three factors, (1) the concern of nurses in the two selected hospitals regarding an apparently high occurrence of postoperative catheterizations, (2) an increasing body of literature condemning the catheter as a frequent source of urinary infection, and (3) a twelve-year time lapse since the last study found.

A review of hospital patient records was conducted for those patients who had surgery between October 1, 1961, and December 31, 1961, in two selected hospitals. The patients eligible for the study were limited by age, operation and type of anesthetic.

The data collected were analyzed to discover the incidence of voluntary voiding, intermittent catheterization and retention catheterization. The relationship of method of bladder evacuation to various factors was also analyzed.

Voluntary voiding was found to occur in 61.6 per cent of the patients. Intermittent catheterization occurred among 12.4 per cent

of the cases and 26 per cent were subjected to retention catheterization postoperatively.

The highest incidence of voluntary voiding occurred in patients having head-neck, integumentary and diagnostic surgeries. The event of intermittent catheterization occurred most frequently following neurological and rectal surgery in both hospitals. The greatest number of patients with retention catheters and a common surgery were found in the gynecological classification.

A relationship was also found to exist between the method of voiding and the age, sex, marital status, admission status, type and length of surgery.

From the data collected it was concluded that the results differed only slightly from previous investigations, the incidence of intermittent catheterization being 0.7 per cent lower in this study.

On the basis of the average time of catheterization and average amount of urine obtained it was also concluded that intermittent catheterization was frequently performed when unnecessary.

Repetition of the study in other hospitals was recommended for the purpose of validation. The presence of symptoms of bladder distention was recommended as a basis for the ordering of intermittent catheterization. It was recommended that an inservice education program for the nurses in both hospitals be developed to review the causes, prevention and treatment of postoperative urinary retention. Stress on the importance of complete and accurate charting of information regarding postoperative bladder evacuation was also recommended for consideration in an inservice education program.