1988

The Relationship Between Position and Incidence of Spinal Headache Following Spinal Anesthesia in the Young Adult Female

Royce A. Fishell

Department of Nurse Anesthesia
School of Allied Health Professions
Virginia Commonwealth University

This is to certify that the thesis prepared by Royce A. Fishell entitled THE RELATIONSHIP BETWEEN POSITION AND INCIDENCE OF SPINAL HEADACHE FOLLOWING SPINAL ANESTHESIA IN THE YOUNG ADULT FEMALE has been approved by his committee as satisfactory completion of the thesis requirement for the degree of Master of Science.

[redacted]
Director of Thesis

[redacted]
Committee Member

[redacted]
Committee Member

[redacted]
Department Chairman

[redacted]
School Dean

June 17, 1988
Date

The Relationship Between Position and Incidence of Spinal Headache Following Spinal Anesthesia in the Young Adult Female

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University

Submitted by:

Royce A. Fishell

Bachelor of Science of Nursing

Montana State University, 1974

Director: Sandra L. Lovell, M.A., M.S., CRNA
Assistant Professor
Director of Research
Department of Nurse Anesthesia
School of Allied Health Professions

Virginia Commonwealth University
Richmond, Virginia
August, 1988

Acknowledgments

This thesis is dedicated to my wife, Linda, and children, Ryan, Christopher, and Lindsey, who without their continued support and personal sacrifices this educational endeavor would not have been possible.

I would also like to express my gratitude to my committee members, Sandra Lovell, Charles H. Moore, and Dr. Norman H. Blass for their guidance and advice.

Table of Contents

Page

List of Tables

List of Figures

Abstract

THE RELATIONSHIP BETWEEN POSITION AND INCIDENCE OF SPINAL HEADACHE FOLLOWING SPINAL ANESTHESIA IN THE YOUNG ADULT FEMALE

Royce A. Fishell, CRNA, BSN

School of Allied Health Professions, Virginia Commonwealth University, 1988

Major Director: Sandra L. Lovell, M.A., M.S., CRNAP

This investigation determined the difference in the incidence of spinal headache in 33 patients placed in 30 degrees (°) head-up position versus 33 patients who remained flat for four hours following the administration of spinal anesthesia. An experimental design was used. The two randomly assigned groups presented for elective postpartum tubal ligation under spinal anesthesia. Group A was placed flat and group B had the head of their beds elevated 30° postoperatively. Strict procedural protocol was adhered to prior to and during the administration of the spinal anesthetic. To determine if the patients had any symptoms consistent with spinal headache, patients were visited postoperatively in the hospital and were contacted again on the seventh to ninth postoperative day. Pain in the frontal and/or occipital area which was aggravated by

sitting up and relieved by lying down was used as the criteria for spinal headache. The data were analyzed using the Fisher Exact Test.

There was no statistically significant difference in the incidence of headache between the postpartum tubal ligation patients who were placed flat postoperatively and those who had the head of their bed elevated 30° ($p = 1$). The null hypothesis was therefore supported at $p > .05$. The findings support relaxing restrictions placed on patient's positioning following spinal anesthesia.

Chapter One

INTRODUCTION

In today's practice of spinal anesthesia there are several different approaches to the positioning of patients in the postoperative period following dura puncture in an effort to avoid spinal headaches. Individual anesthesia practitioners have their own approaches to positioning, as do our nursing and surgical colleagues. Variations in restrictions on positioning in the postoperative period range from no restrictions on positioning to complete bed rest (flat) for 24 hours. As a result of this inconsistency in positioning, patients are often arbitrarily informed to remain flat for extended periods of time. Unfortunately this can be a factor in the patient's refusal of spinal anesthesia. If it can be shown through a carefully controlled study that the risk of spinal headache is not increased by placing patients in a 30 degree (°) head-up position following spinal anesthesia, then there may be a greater acceptance of spinal anesthesia. The removal of this concern on the part of the patient should make it easier for the practitioner to offer the safest anesthetic choice to the patient.

Statement of Purpose

The purpose of this study was to determine whether there is an increased incidence of spinal headache in those patients placed in a 30° head-up position following spinal anesthesia for postpartum tubal ligation.

Definition of Terms

1. Spinal anesthesia. Anesthesia produced by injecting local anesthetic into the subarachnoid space via a 22 or 25 gauge spinal needle inserted between the third and fourth lumbar vertebrae or between the fourth and fifth lumbar vertebrae.

2. Postpartum. One to three days following childbirth.

3. Tubal ligation. A surgical procedure in which the fallopian tubes are ligated and/or cut for the purpose of sterilization via an abdominal incision.

4. ASA Class I. The American Society of Anesthesiologist's classification category of patients with no systemic diseases.

5. ASA Class II. The American Society of Anesthesiologist's classification category of patients with minor systemic diseases that are under control.

6. Spinal headache. A headache that occurs following spinal anesthesia, is posture dependent, and is usually relieved with recumbency.

Limitations

The following limitations of this study were identified:

1. The lack of standardized criteria for the diagnosis of spinal headache may make the diagnosis difficult to confirm.

2. The sample was confined to one major medical center in a metropolitan area of the southeastern United States.

3. The investigator administered all of the spinal anesthetics.

Delimitations

1. Only patients who had postpartum tubal ligations were included in the study.

2. The sample consisted of 66 ASA I or II female patients who were scheduled for elective postpartum tubal ligation.

3. The sample consisted of patients who had no contraindication to spinal anesthesia.

4. The sampling method was based on a table of random numbers.

Hypothesis

Patients who are placed in a head-up position following spinal anesthesia for tubal ligation have no greater incidence of spinal headache than postpartum patients who are maintained flat for four hours following spinal anesthesia for tubal ligation.

Independent and Dependent Variables

The independent variable was the position (flat or head-elevated) the patient was placed in following spinal anesthesia.

The dependent variable was the incidence of spinal headache.

Theoretical Framework

Cerebral spinal fluid is a clear, colorless solution with a total volume of approximately 150 milliliters (mL). This 150 mL is shared between the subarachnoid space and the ventricular compartments of the brain. Thirty milliliters occupies the subarachnoid space, and the remaining 120 mL occupies the ventricles. The normal cerebral spinal fluid pressure in the horizontal position is 130 millimeters (mm) of water, with a normal range of 70 to 180 mm. The major portion of the cerebral spinal fluid is produced by the choroid plexus, which are outpouches of the cerebral vascular system. The rate of

choroidal secretion is estimated to be 840 mL per day. Cerebral spinal fluid travels from the subarachnoid space upward toward the cerebrum, where the arachnoid villi reabsorb the cerebral spinal fluid and empty into the venous sinuses (Guyton, 1976). Changes in the dynamics of the cerebral spinal fluid can result in headache.

One accepted theory of spinal headache is that spinal headache occurs as a result of an aseptic meningeal reaction to the injected solution or as a consequence of poor aseptic technique resulting in the injection of organisms causing a septic meningeal inflammatory reaction (meningitis) (Macintosh, 1985). Other potential irritants include the powder from the practitioner's gloves, and/or the injection of a minute amount of the antiseptic solution used to cleanse the skin. These reactions result in an increased production or decreased absorption of cerebral spinal fluid, which results in increased cerebral spinal fluid pressure and headache (Lund, 1971). This has been referred to as a hypertensive spinal headache.

Leakage of cerebral spinal fluid via the dura puncture is the basis for the most popular theory of postspinal headache (Phillip, 1983). The hypothesis for spinal headache is explained by cerebral spinal fluid leaking from the puncture site in the dura, resulting in a decrease in cerebral spinal fluid pressure. The decreased cerebral spinal fluid pressure allows the brain to sag and creates

traction on cerebral pain sensitive structures, (e.g. blood vessels, dura and dura sinuses) (Moore, 1965). Sechzer (1979) also suggests that cerebral blood flow increases in an effort to compensate for the decrease in the quantity and pressure of cerebral spinal fluid. This results in vessel wall and perivascular edema, which may also contribute to an additional vascular component of the spinal headache. When the patient assumes an upright position, all these factors are aggravated and the patie. complains of a headache.

The size of the hole made in the dura is directly related to the size of the needle and to the position of the bevel as it penetrates the dura (Macintosh, 1985). The combination of the use of a small spinal needle and bevel position is well established in the literature as a method for decreasing the size of the dura hole. Using the above technique results in a decrease in the amount of cerebral spinal fluid leakage, with minimal changes in the quantity and pressure of cerebral spinal fluid. It is the leakage of cerebral spinal fluid through the dura hole that resulted in the requirement for patients to remain flat following spinal anesthesia. This was justified by the fact that the cerebral spinal fluid leakage was decreased, preventing the stimulation of pain-sensitive cranial

structures and perhaps aiding in the speed of closure of the hole in the dura (Jones, 1974). The skill of the anesthesia practitioner administering the spinal anesthetic may also affect cerebral spinal fluid leakages: as the skill of the practitioner increases, generally fewer attempts (dura punctures) are required to effectively administer the spinal anesthetic, and the risk of inadvertent dura punctures declines.

There are few hypotheses to explain the phenomenon of spinal headache, but there exists no conclusive evidence that placing individuals in the sitting position does indeed predispose the patient to spinal headache. In fact, Baumgarten (1987) has recently theorized that sitting patients up may actually decrease cerebral spinal fluid leakage. He feels this is due to the fact that the dura sac actually balloons out with the patient in the upright position, approximating the dura hole to the spinal canal and possibly decreasing leakage of cerebral spinal fluid.

In conclusion, the leakage of cerebral spinal fluid via the dura puncture is the most widely accepted theory for the etiology of postspinal headache, and it is as a

result of this theory that the supine postspinal position has been advocated. However, with the use of the 22 or 25 gauge spinal needle, individuals have found little value in adhering to a policy of strict recumbency in the postanesthesia period (Vandam and Dripps, 1956). The purpose of this study, then, was to determine whether relaxing position restrictions during the postoperative period in patients who have received spinal anesthesia will affect the incidence of spinal headache. The following chapters will discuss the literature review, methodology, and analysis of results. The final chapter describes the results, interesting findings, and implications for future research.

Chapter Two

LITERATURE REVIEW

The first documented spinal anesthetic was performed by Corning (1885), who accidently perforated the dura of a dog. It was not until 1898 that spinal anesthesia was introduced into clinical practice by August Bier who allowed his assistant to attempt a spinal on him (Bonica, 1965). Unfortunately, Bier developed a spinal headache, which he attributed to the leakage of cerebral spinal fluid via the dura puncture, thus the beginning of the leakage theory. Several other investigators (Glesne, 1950; Kunkle, Ray, & Wolf, 1943; Lund, 1968; McRobert, 1918) have agreed with Bier as to the cause of spinal headache. Cerebral spinal fluid leakage continues to be a widely accepted theory today. Secondary to the leakage theory and its relationship to spinal headache, many investigators have studied the process in an attempt to develop means to decrease cerebral fluid leakage.

The use of a small needle and good technique have been demonstrated by investigators to reduce the size of the dura hole, resulting in decreased leakage of cerebral spinal fluid. Green (1949) showed the effects of different

gauge needles on the prophylaxis of headache following spinal analgesia for vaginal delivery. He studied 108 patients who had their spinal anesthesia administered with a 22 gauge needle and reported a 10% incidence of spinal headache, compared to a 0.4% incidence of spinal headache in 700 patients who had their spinal anesthesia administered with a 26 gauge needle.

Additional studies have also reported the incidence of spinal headache with the use of a 25 gauge spinal needle. The incidence of headache ranges from as high as 37% to as little as 4%. Although the studies were performed at different institutions for different procedures, these studies represent the wide variance in the reported incidence of spinal headaches using a 25 gauge needle (Flatten & Raeder, 1985; Bembridge, Macdonald, & Lyons, 1986; Benzon, Linde, Molloy, & Brunner, 1980; Jones, 1974).

Another study was performed by Mihic (1985) to demonstrate the effect of bevel direction on the size of dura puncture. Mihic studied two groups of patients. The first group, consisting of 482 patients, had the bevel of the spinal needle inserted parallel to the longitudinal fibers of the dura. The second group, consisting of 62 patients, received their spinal with the bevel of the needle perpendicular to the fibers of the dura. Mihic showed that there was a 0.24% incidence of headache in those patients who had the bevel placed parallel to the

dura fibers versus 16.1% in those who had the bevel of the needle placed perpendicular to the dura fibers. Mihic concluded that the increased incidence of spinal headache with the perpendicular positioned needle bevel was due to a larger hole in the dura, resulting in a greater loss of cerebral spinal fluid. The larger hole in the dura is a result of the bevel cutting the longitudinal dura fibers when inserted perpendicular, as opposed to spreading the longitudinal fibers when the bevel is inserted parallel to the fibers (see Figure 1). Mihic also reported no significant findings comparing the 22 and 25 gauge spinal needle in either group. Vandam and Dripps (1956) also reported fewer headaches in those patients when the needle was inserted parallel to the dura fibers. Hart and Whitacre (1951) suggested that the needle point separates or penetrates the fibers in a fashion that would decrease the trauma of cutting or tearing the fibers of the dura. As a result of their reasoning, they developed a spinal needle with a solid end that is drawn to a point similar to the shape of a sharpened pencil, with the opening on the side, just proximal to the solid tip (i.e, Pencil-point needle, or Whitacre needle). They proposed that the use of this needle would decrease the leakage of cerebral spinal fluid postoperatively.

As a result of the leakage theory, there has been an assumption that being placed in the supine position inhibits leakage of cerebral spinal fluid and/or promotes healing of the dura hole by decreasing lumbar cerebral spinal fluid pressure. It is because of this assumption that there has long been a controversy over the patient's position following spinal anesthesia. Jones (1974) studied the optimal time for patients to remain flat following spinal anesthesia in order to decrease the incidence of spinal headache. He studied 1,134 patients who had their spinal anesthetic administered with 17, 18, 20, and 25 gauge needles. Following spinal anesthesia, the patients remained flat from 4 to 12 hours. The investigator found the highest incidence of headache, 10.4%, in two different recumbency periods, 5 and 12 hours. He concluded that these groups were not significantly different from other patients placed flat for six or nine hours. Therefore the author determined there to be no optimal time between 4 and 12 hours that patients should remain flat following spinal anesthesia. Following the study, Jones recommended ambulation as soon as motor function permits.

Carbaat and Van Crevel (1981) studies 100 patients who had diagnostic lumbar punctures, 50 of whom remained flat for 24 hours after puncture and 50 patients who were allowed to ambulate immediately postpuncture. They found no significant difference in the incidence of headache when

the groups were compared using Fisher's Exact Test. Thirty-eight percent of the patients in the ambulatory group developed a headache versus 36% of the patients in the bed rest group. The authors concluded that bed rest does not decrease the incidence of spinal headache.

Flatten, Rodt, Rosland, and Vamnes (1987) reported on the incidence of headache as it relates to the patient's sex and age. A total of 227 patients were studied; 85 of the patients were female. The age of the patients ranged from 18 to 58 years, with a mean of 28.5 years. Results of the study showed the overall incidence of spinal headache to be 20.6%. Three age groups were studied: 18-29, 30-39, and 40-58 years. Females had a higher incidence of headaches than males in all three groups: 61.5% vs. 23%, 19% vs. 9% and 12% vs. 9%, respectively. The incidence of headache decreased in the female patients as their age increased. The authors offered no statistical findings between the different age groups. Additionally, the authors found no statistically significant difference for the total population between male and female patients. Vandam and Dripps (1956) also reported a increased incidence of spinal headache in female patients, (14% vs. 7% in the male patient).

Vandam and Dripps (1956), in a classic followup study of 10,098 patients who received spinal anesthesia, documented the time following spinal anesthesia when

patients became symptomatic for spinal headache. Their investigation revealed spinal headaches to occur as soon as the same day of administration, or as late as twelve months following the dura puncture. They reported 86% of the headaches occurred in the first seven days following dura puncture, and the remaining 14% occurred between eight days and twelve months. Fifty-three percent of patients who complained of headache were symptom-free after four days.

Conclusion

Various studies support small gauge needles and specific techniques to decrease the size of the dura puncture as a means of reducing the incidence of spinal headaches. Others show that prolonged bed rest does not appear to decrease the incidence of spinal headache. This study will supply additional information for the literature to evaluate head elevation (sitting position) and its relationship to headache.

Chapter Three

METHODOLOGY

Population, Setting, and Sample

The population consisted of all patients scheduled for postpartum tubal ligation. The sample was comprised of 66 ASA Class I or II patients who had an uncomplicated delivery, and consented to spinal anesthesia. The setting was in the labor and delivery suite of a large Southeastern University Hospital.

Design

The research design used for this study was experimental. Group A of the study was used as the control group (flat) and group B was the experimental group (head-elevated). The subjects were randomly assigned to the groups using a table of random numbers.

Protocol

All patients were seen preoperatively and informed consent for spinal anesthesia was obtained. Prior to administering the spinal, all patients had an intravenous line of balanced salt solution started with a minimum of

1,000 mL infused. The patients were also given intravenous midazolam (Versed), as necessary, for sedation on arrival to the operating room. As is customary, the patients' blood loss was monitored. The total amount of intravenous fluid, intravenous sedation, and estimated blood loss was documented at the completion of each procedure.

After applying monitoring devices and obtaining baseline vital signs, the patient was placed in a right lateral knee to chest position for placement of the spinal anesthetic. The lumbar area was prepped with betadine solution and wiped clear with alcohol prior to insertion of the needles. The practitioner's gloves were also rinsed with alcohol prior to inserting the needles. The effect of the alcohol was to remove glove powder and betadine residue that could serve as possible irritants in the subarachnoid space. The lumbar area was then draped in a sterile fashion using the disposable drapes provided in the commercially prepared spinal tray. Lumbar level 3-4 or 4-5 (L3-4 or L4-5) was then located and 0.5-1 mL of 1% procaine was infiltrated in the subcutaneous tissue to anesthetize the skin and dermis prior to placing the spinal needle. A 19 gauge needle was inserted at L3-4 or L4-5 via the midline approach as an introducer, followed by a 25 gauge spinal needle, which was inserted with the bevel parallel to the dura fibers. If a patient was so obese that her landmarks (i.e, lumbar vertebrae) could not be palpated,

the patient was placed in a sitting position and a 22 gauge spinal needle with its bevel parallel to the dura fibers was inserted. The 22 gauge needle provided an additional one-half centimeter in length that was often required in the obese patients. When the dura was punctured, a dose of 5% xylocaine (50-80 mg, determined by the patient's height) in 7.5% dextrose with epinephrine was injected. Upon completion of the injection of the anesthetic, the needle/needles were removed and the patient was returned to the supine position and prepared for surgery.

Following surgery, the patients were returned to the postanesthesia recovery area, group A flat for four hours and group B with the head of the bed elevated 30°, determined by the use of a goniometer. Thirty degrees elevation was selected because it was easily and consistently attained on the recovery beds in use at the facility, and provided comfort to the patient. Both groups of patients remained in the assigned position throughout the recovery room period. Patients were discharged from the recovery area when full motor and sensory intervention had returned, at which time group B had no position restrictions placed upon them and group A remained flat for the remainder of the four hours.

Plan of Investigation

Postoperatively, the patients were visited on the morning following surgery by the investigator who administered the spinal anesthetic to evaluate patients for symptoms consistent with spinal headache. The diagnosis of spinal headache was made according to the definition of Vandam and Dripps (1956) (i.e., a headache that occurs after spinal anesthesia, is posture dependent, and is usually relieved with recumbency).

All patients were contacted by phone between the seventh and ninth postoperative day and specifically asked the following questions:

1. Had they been seen or treated at any medical treatment facility since discharge?

2. Had they returned to their doctor for any problems since discharge?

3. Had they suffered any problems which they attributed to their anesthesia?

"Headache" was specifically not mentioned in an attempt to avoid soliciting psychosomatic complaints and to limit the effect of suggestion on symptoms reported. If a positive response was obtained to any of the previous questions, additional questions were asked to determine if, in fact, there was an anesthetic related problem, specifically, spinal headache. If any patient voiced

symptoms consistent with spinal headache, she was instructed to return to the hospital to be evaluated.

Data Analysis

The Fisher Exact Test, *t* test, and chi-square analysis were used for data analysis. A $p < .05$ was considered significant.

Consent

The Committee for the Conduct of Human Research was consulted about the need for a written consent to be signed by the participants in this study. Due to the routine nature of the procedure performed for this study, it was concluded that written consent would not be necessary. However, all of the patients gave informed consent for spinal anesthesia.

Chapter Four

RESULTS

The sample consisted of 66 patients who received spinal anesthesia for postpartum bilateral tubal ligation. The patients were evenly distributed between the two groups. The characteristics of the groups were compared using the *t* test (Table 1). There were no statistically significant differences between the two groups with regard to age or weight. There was a significant difference in height ($p = .0056$). However, there is no evidence in the literature that would suggest that this finding is clinically significant.

One patient from group B had a headache postoperatively. There were no reported headaches in group A. Sixty of the patients received their spinal anesthesia using a 25 gauge needle (90.0%) and the remaining six patients (9%) had their spinal anesthesia administered using a 22 gauge needle. There were no reported cases of spinal headache in the patients who received their spinal with a 22 gauge needle.

Table 1

Data for Age, Weight, and Height

Group	Group A (Flat)	Group B (Head of Bed Elevated)
Age (yrs)	26.60 (21-37)	28.54 (21-43)
Weight (lbs)	167.45 (115-280)	155.63 (95-300)
*Height (ins)	65.51 (60-70)	63.45 (55.69)

Note: values reported as mean (range)

* $p < .05$

The incidence of spinal headache was, therefore, 1.5% in the total population (1 in 66) or 1.6% in the 25 gauge needle group (1 in 60). A *p*-value of one was determined by the Fisher Exact Test, and since this is larger than the rejection value of .05, this study fails to reject the null hypothesis. Therefore there was no statistically significant difference in the incidence of headaches between the two groups.

There was no difference between the two groups in the total amount of intravenous fluids administered, or total estimated blood loss, as determined by the *t* test (Table 2). The two groups were also compared using the chi-square analysis to determine if there was a significant difference in difficulty between the two groups. The chi-square analysis was also used to determine if there was a difference for intraoperative sedation between the two groups. Neither variable was significant at $p < .05$.

Table 2

Total Intravenous Fluid Administration and Estimated Blood Loss (EBL)

	Group A	Group B
Total IV Fluid Administration (mL)	1989.39 (1200 - 3600)	1945.45 (1400 - 2600)
Estimated Blood Loss (mL)	17.60 (5 - 50)	19.69 (5 - 75)

Note: values reported as mean (range)

Chapter Five

DISCUSSION

The results of this study demonstrated no statistically significant difference between the position of the patient in the immediate postoperative period and the development of spinal headache. The hypothesis that patients who are placed in a head-up position following spinal anesthesia for tubal ligation have no greater incidence of spinal headache than postpartum patients who are maintained flat four hours following spinal anesthesia for tubal ligation was supported.

Several minor difficulties were encountered with the study. The first difficulty was in obtaining a large sample over the time period available for data collection. Another problem occurred when one of the patients could not be contacted during the follow-up study period because of lack of a telephone. However, this patient was free of any signs or symptoms of headache upon discharge from the hospital on the second postoperative day, and there was no record of her returning to the emergency room or OB clinic with symptoms consistent with headache. She was, therefore, included in the sample.

Two patients in the study each received two subarachnoid punctures with a 25 gauge needle for their tubal ligation due to unilateral anesthesia. One of these patients received adequate analgesia after her second spinal, while the second patient continued to have inadequate analgesia and required general anesthesia for her tubal ligation. Although these patients received two 25 gauge atraumatic subarachnoid punctures, and were in the head-up group, neither patient had any symptoms consistent with spinal headache the following day or during the telephone interview. One additional patient also had inadequate analgesia for her tubal ligation following spinal anesthesia and received general anesthesia. This patient was in the control group and offered no complaints consistent with spinal headache.

The administration of spinal anesthesia was frequently difficult in obese patients, although there were a few other patients who, while not obese, were also technically difficult (required greater than two attempts). Even though these patients often required multiple attempts (three to six), and often a larger spinal needle (22 gauge), there were no reported spinal headaches in this technically difficult group of patients. The additional attempts were required to identify the mid-line and/or to locate the interspace between the lumbar vertebrae. Although these patients received multiple attempts, there

was little chance that the dura was actually punctured, which may account for the lack of symptoms consistent with spinal headache.

The only patient who suffered a spinal headache was a relatively thin patient (5'-7", 148 pounds) who received her spinal anesthetic with a single puncture using a 25 gauge spinal needle. Young patients have frequently been reported to have a higher incidence of spinal headaches following spinal anesthesia (Vandam and Dripps, 1956). The present study showed a low incidence of spinal headaches in a relatively young female population, but as previously stated, there is a wide variance in the reported incidence of spinal headache.

The inconsistency in the previously reported incidence of spinal headache may be partially due to the differing criteria used to make the diagnosis of spinal headache. The only patient that met the criteria for spinal headache in this study had symptoms that were classical for those described by Vandam and Dripps (1956). The remaining 65 patients offered no complaints consistent with spinal headache, either postoperatively or in the telephone interview, excluding the patient who could not be contacted.

The incidence of spinal headache in this study is less than previously reported in the young female patient. There may be several reasons that account for the lower incidence of spinal headache in this study. First, a large sample size might alter the findings in this study. The fact that one person administered all of the spinals may have eliminated the variable involved with different individual techniques and skill. Also, the cleansing of the betadine solution from the patients skin and rinsing the powder from the gloves with alcohol may have eliminated an inflammatory process with could increase the incidence of spinal headache.

Recommendations

The results of this study support allowing patients to assume a position of comfort following spinal anesthesia, to include elevation of one's head if desired. These findings may be more generally applied if the sample were broadened to include both male and female patients undergoing other types of surgery with spinal anesthesia. This would allow for the results to be applied to the population in general, and not to a specific age group or gender. This would increase the sample size making the study more valuable. In addition, further investigation into various techniques of performing subarachnoid blocks used by individual practitioners may clarify the importance

of technique as related to the incidence of spinal headache.

References

References

Baumgarden, R. (1987). Should caffeine become the first-line'ts

treatment for postdural puncture headache? Anesthesia and Analgesia, 66, 919-914.

Bembridge, M., Macdonald R., & Lyons, G. (1986). Spinal anesthesia with hyperbaric lignocaine for elective caesarean section. Anaesthesia, 41, 906-909.

Benzon, H., Linde, H., Molloy, R., & Brunner, E. (1980). Postdural puncture headache in patients with chronic pain. Anesthesia and Analgesia, 59, 772-774.

Bonica, J. (1965). Fundamental considerations: Vol. 1. Principles and practice of obstetrical analgesia and anesthesia. Philadelphia: F.A. Davis Company.

Carbatt, P. & Van Crevel, H. (1981). Lumbar puncture headache: Controlled study on the preventive effect of 24 hours bed rest. The Lancet, 2, 1133-1135.

Corning, J. (1885). Spinal anesthesia and local medication of the cord. The New York Medical Journal, 42, 483-485.

Flatten, F., Rodt, S., Rosland, J., & Vamnes, J. (1987). Postoperative headache in young patients after spinal anaesthesia. Anaesthesia, 42, 202-2051.

Flatten, H. & Raeder, J. (1985). Spinal anaesthesia for outpatient surgery. Anaesthesia, 40, 1108-1111.

Glesne, O. (1950). Lumbar puncture headaches. Anesthesiology, 11, 702-708.

Greene, B. (1950). A 26 gauge lumbar puncture needle: Its value in the prophylaxis of headache following spinal analgesia for vaginal delivery. Anesthesiology, 11, 464-469.

Guyton, A. (1976). The special fluid systems of the body-Cerebrospinal, occular, pleural, pericardial, peritoneal, and synovial. Textbook of Medical Physiology (5th ed.). Philadelphia: W.B. Saunders Company.

Hart, J. & Whitacre, R. (1951). Pencil-point needle in prevention of postspinal headache. Journal of the American Medical Association, 147, 657-659.

Jones, R. (1974). The role of recumbency in the prevention and treatment of postspinal headache. Anesthesia and Analgesia, 53, 788-796.

Kunkle, E., Ray, B., & Wolf, H. (1943). Experimental studies on headaches, analysis of the headache associated with changes in intracranial pressure. Archives of Neurology and Psychiatry, 49, 323-358.

Lund, P. (1971). Complications, Vol. 2. Principles and practices of spinal anesthesia. Springfield, MASS: Charles C. Thomas.

Lund, P., & Cwik, J. (1968). Modern trends in spinal anaesthesia. Canadian Anaesthetist Society Journal, 15, 118-134.

Macintosh, R. (1985). Complications and sequelae. In L. Lee, R. Atkinson, & M. Watt, (Eds.), Sir Robert Macintosh's lumbar puncture and spinal anesthesia (4th ed.). New York: Churchill Livingstone.

McRobert, R. (1918). Cause of lumbar puncture headache. Journal of the American Medical Association, 70, 1350-1353.

Mihic, D. (1985). Postspinal headache and relationship of needle bevel to longitudinal dural fibers. Regional Anesthesia, 10, 76-81.

Moore, D.C. (1965). Single dose of spinal anesthesia. In D.C. Moore (Ed.), Regional block (4th ed.). Springfield, MASS: Charles E. Thomas.

Philip, B. (1983). Complications of regional anesthesia for obstetrics. Regional Anesthesia, 8, 17-30.

Sechzer, P. (1979). Postspinal anesthesia headache treated with caffeine. Part II: Intracranial vascular distention, a key factor. Current Therapeutic Research, 26, 440-447.

Vandam, L., & Dripps, R. (1956). Long-term follow-up of patients who received 10,098 spinal anesthetics. Journal of the American Medical Association, 161, 586-591.

References

Baumgarden, R. (1987). Should caffeine become the first-line treatment for postdural puncture headache? Anesthesia and Analgesia, 66, 919-914.

Bembridge, M., Macdonald R., & Lyons, G. (1986). Spinal anesthesia with hyperbaric lignocaine for elective caesarean section. Anaesthesia, 41, 906-909.

Benzon, H., Linde, H., Molloy, R., & Brunner, E. (1980). Postdural puncture headache in patients with chronic pain. Anesthesia and Analgesia, 59, 772-774.

Bonica, J. (1965). Fundamental considerations: Vol. 1. Principles and practice of obstetrical analgesia and anesthesia. Philadelphia: F.A. Davis Company.

Carbatt, P. & Van Crevel, H. (1981). Lumbar puncture headache: Controlled study on the preventive effect of 24 hours bed rest. The Lancet, 2, 1133-1135.

Corning, J. (1885). Spinal anesthesia and local medication of the cord. The New York Medical Journal, 42, 483-485.

Flatten, F., Rodt, S., Rosland, J., & Vamnes, J. (1987). Postoperative headache in young patients after spinal anaesthesia. Anaesthesia, 42, 202-2051.

Flatten, H. & Raeder, J. (1985). Spinal anaesthesia for outpatient surgery. Anaesthesia, 40, 1108-1111.

Glesne, O. (1950). Lumbar puncture headaches. Anesthesiology, 11, 702-708.

Greene, B. (1950). A 26 gauge lumbar puncture needle: Its value in the prophylaxis of headache following spinal analgesia for vaginal delivery. Anesthesiology, 11, 464-469.

Guyton, A. (1976). The special fluid systems of the body-Cerebrospinal, occular, pleural, pericardial, peritoneal, and synovial. Textbook of Medical Physiology (5th ed.). Philadelphia: W.B. Saunders Company.

Hart, J. & Whitacre, R. (1951). Pencil-point needle in prevention of postspinal headache. Journal of the American Medical Association, 147, 657-659.

Jones, R. (1974). The role of recumbency in the prevention and treatment of postspinal headache. Anesthesia and Analgesia, 53, 788-796.

Kunkle, E., Ray, B., & Wolf, H. (1943). Experimental studies on headaches, analysis of the headache associated with changes in intracranial pressure. Archives of Neurology and Psychiatry, 49, 323-358.

Lund, P. (1971). Complications, Vol. 2. Principles and practices of spinal anesthesia. Springfield, MASS: Charles C. Thomas.

Lund, P., & Cwik, J. (1968). Modern trends in spinal anaesthesia. Canadian Anaesthetist Society Journal, 15, 118-134.

Macintosh, R. (1985). Complications and sequelae. In L. Lee, R. Atkinson, & M. Watt, (Eds.), Sir Robert Macintosh's lumbar puncture and spinal anesthesia (4th ed.). New York: Churchill Livingstone.

McRobert, R. (1918). Cause of lumbar puncture headache. Journal of the American Medical Association, 70, 1350-1353.

Mihic, D. (1985). Postspinal headache and relationship of needle bevel to longitudinal dural fibers. Regional Anesthesia, 10, 76-81.

Moore, D.C. (1965). Single dose of spinal anesthesia. In D.C. Moore (Ed.), Regional block (4th ed.). Springfield, MASS: Charles E. Thomas.

Philip, B. (1983). Complications of regional anesthesia for obstetrics. Regional Anesthesia, 8, 17-30.

Sechzer, P. (1979). Postspinal anesthesia headache treated with caffeine. Part II: Intracranial vascular distention, a key factor. Current Therapeutic Research, 26, 440-447.

Vandam, L., & Dripps, R. (1956). Long-term follow-up of patients who received 10,098 spinal anesthetics. Journal of the American Medical Association, 161, 586-591.

Page 32 was blank at time of digitization.

Vita