

Spinal block complications in obstetrics and gynecology patients

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ABSTRACT

Objective: To determine spinal complications during and after surgery in obstetrics and gynecological patients.

Methods: We conducted a descriptive study in Al-Wahda and Aden Teaching Hospitals in Aden, Yemen from March 2004 to March 2005. One hundred and fifty obstetrics and gynecological patients were enrolled. Before and during surgery, pulse and blood pressure was monitored, and patients were observed for any complications of spinal anesthesia, for example, hypotension, nausea, vomiting, shivering, and total spinal block. Post operatively, the patients were followed to identify post-spinal headache, urine retention, neuralgia, back pain, and respiratory failure. Results of complications were related by applying statistical test.

Results: Hypotension during surgery was established at a very high percentage of 82%. This could be due to lack

of preloading of the patients before spinal block. Vomiting was 61%, nausea 56%, shivering 30%, and total spinal anesthesia 2%. Post operatively, 77.3% patients had post spinal headache, which lasted 4 days, compared with patients who had been applied with non-cutting disposable needles. Urine retention was 38.7%, while back pain and neuralgia was 21.3% each, and respiratory failure was 1.3%.

Conclusions: Hypotension was traced in a very high percentage of cases due to unawareness and ignorance of pre-anesthetic intravenous fluid loading by concerned staff. Post spinal headache was the second most common complication due to the usage of large, cutting, non-disposable needles.

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In 1986, a report on Confidential Enquiries into Maternal Deaths (CEMD) in England and Wales revealed that anesthesia was the third most common cause of maternal death (2.8%).¹ In gynecology and obstetrics (gyne-obstetrics) patients, especially in lower segment cesarean section (LSCS) where spinal anesthesia was more preferable, mortality was approximately 1.2%,² increasing even in the presence of highly advanced equipment and facilities. In obstetrics and gynecological surgery, anesthesia can be used as a general or regional block. There are several reasons for preferring spinal anesthesia instead of general anesthesia, especially for a CS;

it is easy and safe for the mothers and babies. The newborns may be more alert and less sedated, as they have not received a general anesthetic agent through the placental circulation. As the mother's airway is not compromised, there is reduced risk of aspiration of gastric contents causing chemical pneumonitis (Mendelson's syndrome).³ Spinal anesthesia is gaining worldwide popularity in gyne-obstetrics because of its simplicity and ease of performance. It avoids fetal and maternal risk of general anesthesia, and requires minimum postoperative care, and provides postoperative analgesia. Many mothers also welcome the opportunity of being awake during the CS, and

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being able to breast-feed their baby as soon as the operation is completed. There is, however, a slight disadvantage. It may sometimes become difficult to perform the spinal injection when the pregnant uterus impedes lumbar flexion. If labor has started, the mother may be unable to remain still while having contractions. Spinal anesthesia, beside its excellent advantage and indications, does have fairly simple complications, especially in gyne-obstetrics patients during operation and post operatively. Physiologically, spinal anesthesia leads to complete sympathetic block to provide excellent analgesia. Hypotension, nausea, vomiting, total spinal anesthesia, hiccup, shivering and cardiac arrest can arise during surgery.⁴ The most common reasons for hypotension during surgery are the prolonged fasting, and neglecting the preloading of the patients before operation.⁵ Post operative complications are rare, and occasionally involve post spinal headache, respiratory arrest, neuralgia, urine retention, hematoma, brain abscess, and meningitis.⁶ The etiology of the post spinal headache from the spinal block puncture is most likely related to the hole left in the dura after the needle is withdrawn.⁷ This allows the cerebrospinal fluid to leak out of the subarachnoid space. It depletes the cushion of the fluid supporting the brain and its sensitive meningovascular covering resulting in classical headache, which becomes worse when the patient is in the upright position, and is relieved on lying down.⁸ The risk of developing headache from a dural puncture is greater in patients who are young, female, and pregnant. The onset of headache post operatively may be delayed for 24-48 hours, sometimes 3 days, and is severe enough to immobilize the patient.⁹ It can persist for a year or more if untreated, and it can predispose to subdural hematoma.^{10,11} During practice in Aden and Al-Wahda Teaching Hospitals, it was noticed that most of the patients were normally shifted to the operation theater during emergencies or elective operations without assessing them a day before surgery. Thus, the preload of the patient was ignored, especially for spinal anesthesia. Preloading is necessary to avoid complications, which arise from this technique. Since there is no previous study dealing with this problem, it is intended to determine the frequency of spinal block complications in obstetric and gynecological patients during and after surgery, and their causative factors.

Methods. This is a descriptive and prospective study conducted in Aden Hospital and Al-Wahda Gyne-Obstetrics Teaching Hospital from March 2004 to March 2005. One hundred and fifty female patients between the ages of 30-55 years were enrolled in this study. The patients were undergoing emergency or

elective operations, for example, lower segment CS (LSCS), forceps delivery, retained placenta, ovarian cyst, and hysterectomy. Patients were informed about the importance, objective, and procedure of the research. Their willingness and written consent were obtained in advance to being included in the study. All patients were examined systematically before each operation; they were premedicated by diazepam 5 mg at night and 5 mg in the morning. Some of them were also preloaded by 500 ml and others by 1000 ml of normal saline in the recovery room. Blood pressure and pulse were recorded manually before shifting patients to the operating theater. Patients with contraindication for spinal anesthesia were excluded from the study due to: previous back pain or back anomalies, blood, heart, skin diseases, and migraine. In the operating theater, antiseptic procedures were used to perform spinal anesthesia, either in a sitting or lateral position between the level of lumbar 3 and 4 (L3-L4), with 5% heavy Xylocaine (2 ml) or 2 ml of Marcaine for all studied patients including LSCS and hysterectomy. Checking the availability of spinal needle to be used for patients (sizes 20, 21, 22 and 25 gauge needle) also was taken into account. During surgery, pulse and blood pressure were recorded manually in the first 15 minutes. Oxygen saturation was not taken into consideration due to the absence of this facility in the studied hospitals. Any complication of spinal anesthesia that could arise during surgery, such as hypotension, nausea and vomiting, hiccup, shivering, and total spinal block was checked. In the following 4 post operative days, the patients were examined for post spinal headache, urine retention, meningitis, epidural abscess, back pain, neuralgia, and respiratory arrest.

Data were processed and analyzed with computer facilities. Summary measures as mean, standard deviation and percentages were used, and difference of means and χ^2 tests were applied with a level of significance of 0.05.

Results. The study was undertaken in Aden Governorate of Yemen, which has a population of more than a million according to the latest population census. We notice that hypotension was identified as the main complication during spinal block surgery immediately after spinal anesthesia. Out of 150 female patients, 123 (82%) were studied during surgery. Hypotension was followed by vomiting 61%, nausea 56%, shivering 30%, and total spinal anesthesia 2%. Out of 150 patients, 108 (72%) were non-preloaded before the procedure, while 15 (10%) patients were preloaded by 500 ml of normal saline, and 27 patients (18%) were preloaded by 1000 ml of normal saline.

In patients who did not receive intravenous fluid, their systolic blood pressure dropped from 110 mm Hg to 65 mm Hg, while in patients who received 500 ml of fluid, their systolic blood pressure dropped from 120 mm Hg to 85 mm Hg, a significant difference. Patients who received 1000 ml of fluid had no change in their systolic blood pressure. The diastolic blood pressure decreased from 75 mm Hg to 50 mm Hg in non-preloaded patients, and in patients who were preloaded by 500 ml of fluid, their diastolic blood pressure dropped from 80 mm Hg to 70 mm Hg, a significant difference. However, in the patients who received 1000 ml of normal saline their diastolic blood pressure did not change. Pulse does not show significant change in patients who received 500 or 1000 ml of normal saline before the procedure (Table 1). However, it showed a significant change in the pulse of patients who did not receive fluids. After surgery, the major complication was post spinal

headache, with 116 (77.3%) patients out of 150. This was followed by urine retention 58 (38.7%), back pain and neuralgia being similar with 32 cases each (21.3%), while respiratory failure had low percentage with 2 cases only (1.3 %). Table 2 shows the relation between post spinal headache and size of the needle, and shows that post spinal headache is related to needle size. The post spinal headache was more frequent in patients who were injected with large size needles, starting from 20 to 22, while it revealed less in patients injected with small sized needles. Table 3 shows the duration of the post spinal headache in relation to different sizes of needle. Patients on whom a fine needle 25 gauge was used, reported that their headache disappeared on the second day; while patients on whom a large size needle was used reported that their post spinal headache persisted to the fourth day. Out of 150 patients, 116 (77.3%) managed their headache by oral and intravenous fluids, while 85 patients (56.7%) were treated by analgesic tablets.

Table 1 - Pulse before and after anesthesia by preloading.

Preloading	Pulse before spinal block		Pulse after spinal block		t-test	p-value
	Mean	SD	Mean	SD		
Non preloading	85	3.5	67	5.0	30.65	0.0000
Preloading 500 ml	78	5.0	72	5.5	3.13	0.0040
Preloading 1000 ml	75	6.0	78	5.5	1.92	0.0600

Table 2 - Patients with post spinal headache and size of the needle.

Needle size	Total patients		Patients with headache	
	No.	(%)	No.	(%)
20G	46	(30.7)	45	(97.8)
21G	40	(26.7)	36	(90.0)
22G	35	(23.3)	30	(85.7)
25G	29	(19.3)	5	(7.2)
Total	150	(100)	116	(77.3)
$X^2 = 75.8, p = 0.0000$				

Table 3 - Distribution of patients by days with post spinal headache.

Days	Patients n=150	(%)	20G n=46	21G n=40	22G n=35	25G n=29
1 st	116	(77.3)	45	36	30	5
2 nd	90	(60.0)	44	30	16	0
3 rd	46	(30.7)	40	6	0	0
4 th	40	(26.7)	40	0	0	0

Discussion. Spinal anesthesia is the procedure of choice for gyne-obstetrics patients for elective or emergency operations. Studies indicate that most of the complications of spinal anesthesia can be avoided, and decreased up to 0, if there is a preoperative assessment during surgery, and another after surgery.¹² Sympathetic block following spinal anesthesia leads to hypotension due to vasodilatation decrease in the effective circulatory volume, noticed after the case had become severe in the first 15 minutes.¹³ In this study, hypotension is the most frequent complication in spinal anesthesia, particularly in patients who did not receive preloading of fluid before the procedure (72%), compared to patients who received preloading of 1000 ml of normal saline (18%). A simple and effective way of rapidly increasing the blood volume is by raising the leg of patients thus increasing the return of the venous blood to their heart. The administration of adequate fluid 1000-1500 ml of normal saline solutions before surgery can minimize intraoperative hypotension.¹⁴ Bradycardia is common during spinal anesthesia especially if the surgeon is manipulating the bowel or uterus, and is always associated with hypotension.¹⁵ In the obtained result, bradycardia appeared as mean 67 and SD 5 after spinal block. Nausea and vomiting are the first signs of hypotension, and are treated by raising the blood volume with the administration of intravenous fluid. If there is no response, an antiemetic, such as, Ondansetron is effective.¹⁶ Vomiting, in this study, was seen in 61%, while nausea in 56%. The intraoperative treatment was by oxygen and metoclopramide, which is the available drug. Newly researched drugs are not preferable because of their extra pyramidal effect. This

high percentage of nausea and vomiting could be due to lack of preloading of the patients preoperatively.

Shivering while surgery is in progress occurred occasionally due to the application of an injection of cold intrathecal solution, and it is managed by reassurance and oxygen face mask.¹⁷ Shivering in this study was noted in 30% of total spinal anesthesia patients, a rare occurrence but with frightening rapidity. It could result in the death of the patient if it is not quickly recognized on receiving the complaint that the patient has difficulty in breathing and tingling in the arms or hands. In this study, total spinal anesthesia showed a low percentage at 2%.

Post spinal headache is one of the persistent complications post operatively. It begins within a few hours, and continues for a week or more. The latest research proved that it can extend up to one year if not treated.¹⁸ It can frequently accompany symptoms of photophobia, nausea, vomiting, neck stiffness, and dizziness. In this study, post spinal headache also shows a high percentage at 77.3%, most probably due to the use of cutting, and stainless steel needles with large size 20, 21, and 22 gauges, which allows more cerebrospinal fluid leakage. The incidence of headache is related directly to the size of the needle. Thus, to decrease the incidence of spinal headache, disposable and small sized needles should be available of 25, 26, 27, 28, up to 29 gauge. The only problem with this course of action is the availability of the right staff with the right experience.¹⁹ Post spinal headache can also be treated with oral and intravenous analgesics. However, if not treated it may need an epidural patch.²⁰ In this study, most of the patients managed with oral, intravenous fluids, and analgesia, but not with an epidural patch.

As the sacral automatic fibers are amongst the last to recover following spinal anesthesia, urinary retention may occur. If the fluid intraoperative has been less, and the systolic blood pressure has been maintained below 80 mm Hg throughout surgery, this will lead to a decrease in blood flow to the kidney and post operative urine retention.²¹ In this study, urine retention was 38.7% in 58 patients. The patients had difficulty in passing urine over a period of 4 days after surgery. Transient neurological symptoms revealed pain of the lower extremities in the immediate post-operative period. A percentage of 21.3% was noticed for back pain and neuralgia, which had started during surgery, and continued until after surgery. There was an increase in the number of reports on this issue during the last 9 years.²² Instances of respiratory failure after spinal anesthesia were extremely rare. Respiratory failure at a very low percentage of 2.7% was recorded. Lack of facilities (pulse oximeter,

electronic monitoring of vital signs) and the use of the manual assessment were difficulties encountered during this study. As post spinal headache is apparent in most patients, we would recommend carrying out a feasibility study on the different management options.

In conclusion, hypotension is seen as one of the serious and common complications in spinal block during surgery due to the failure of preoperative assessment and preload, which leads to consequent sequels such as bradycardia, nausea, vomiting, and urine retention. Post spinal headache is still frequent in the studied hospitals, which could be avoided by using small, disposable, and non-cutting needles. To control all complications of anesthesia, particularly in spinal block, preoperative assessments are recommended for all patients going for surgery.

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