

Comparison of hemodynamic effect between the spinal anesthesia and saddle block during transurethral resection of the prostate

By

Dr. Farooq Taher Abdulqader ^{*1}; Dr. Ali Abd-Alhameed Mohammed ^{*2}

^{*1} M.B.Ch. B/ F.I.B.M.S. , A &ICU/Ibn Al-Bitar specialized center for cardiac surgery; ^{*2} Consultant Anesthetist/M.B.Ch. B /D. A/F.I.B.M.S /F.A.C.M.S A&IC

Abstract

Background: The best technique for transurethral resection of prostate (TURP) is regional anesthesia. The hypotension is the major complication following spinal anesthesia. The hemodynamic changes is less with saddle block than spinal block. **Aim and Objective:** To compare hemodynamic effect between the spinal block and saddle block in TURP. **Patients and methods:** 50 patients between 50-70 years old ASA I – II prepared for TURP, divided randomly in two groups 25 pt. in each group. Group A received spinal 10 mg of hyperbaric bupivacaine (2 ml of 0.5%), were group B received saddle block 10 mg of hyperbaric bupivacaine (2 ml of 0.5%). The blood pressure, oxygen saturation, heart rate measured and recorded subsequently. The hypotension treated by 100 mcg bolus of phenylephrine. **Results:** In our study there was statically significant difference ($p < 0.05$) between group A which received spinal anesthesia and group B which received saddle block in hemodynamic effect. In which the incidence of hypotension and vasopressor requirement more in group A. **Conclusion:** Under saddle block the TURP can safely performed with low risk of hypotension and less requirement of vasopressor.

Key words: *spinal anesthesia, saddle block, hypotension, Phenylephrine,*

introduction:

Is the gold standard procedure for patients with bladder outlet obstruction due to benign prostatic hyperplasia (BPH), with success rate of 85–90 % ⁽¹⁾ TURP is mostly applied on elderly patients who have hypertension, problems with breathing, circulation system, and kidney functions, therefore, it becomes very important to keep a stable anesthesia that will minimize the hemodynamic differences in these patients. General anesthesia causes more hemodynamic differences compare to regional anesthesia ⁽²⁾. Thus, regional anesthesia is highly preferable in TURP applications.

Is performed by insertion a resectoscope through the urethra and resecting prostatic tissue with an electrically powered cutting-coagulating metal loop or using laser- 22 vaporization energy. This can be accomplished with either a monopolar TURP (M-TURP) or bipolar TURP (B-TURP) technique. Laser energy for TURP has also been used for many years. With each technique, as much prostatic tissue as possible is resected, but the prostatic capsule is usually preserved. If the capsule is violated, large amounts of irrigation solution can be absorbed into the circulation via the periprostatic, retroperitoneal, or peritoneal space. Bleeding during TURP is not uncommon, but usually controllable, when large venous sinuses are opened, hemostasis becomes difficult. If bleeding becomes uncontrollable, the procedure should be terminated as quickly as possible, and a Foley catheter should be passed into the bladder and traction applied to it. The catheter's inflated balloon exerts lateral pressure on the prostatic bed and reduces bleeding. Bleeding requiring transfusion occurs in approximately 2.5% of TURP procedures. ⁽³⁾

Complications of TURP have been markedly reduced after development of bipolar resectoscope (B-TURP) and laser resectoscope (R-TURP) in addition to

wide spread availability of isotonic irrigation solutions ⁽⁴⁾, these complications may include: Absorption of Irrigating Solution; Excessive Circulatory Volume, Hyponatremia, and Hypoosmolality ; Glycine Toxicity; Ammonia Toxicity; Perforation ; Transient Bacteremia and Septicemia; Hypothermia ; Bleeding and Coagulopathy.

Anesthesia Spinal anesthesia is produced by injection of a local anesthetic drug into the subarachnoid space creating a conduction blockade of the spinal nerves and resulting in a rapid, dense, and predictable state of anesthesia. Saddle anesthesia is a selective spinal anesthesia that directs a small bolus of local anesthetic toward the last four sacral spinal segments (S2–S5) and coccygeal nerve roots ⁽⁵⁾. In saddle block anesthesia the patient remain in sitting position for at least five minutes after injection of local anesthetic, provides anesthesia in area of the perineum, buttocks, and inner thigh. An ideal “saddle block” anesthetizes the area that would touch a saddle if the patient were riding a horse. Spinal anesthesia is an ideal choice for surgeries below the level of the umbilicus. Examples include low abdominal, inguinal, genitourinary, gynecologic, rectal, and lower-extremity surgeries. Spinal anesthesia is not widely used for upper abdominal procedures because of the need for a very high level of block that may increase the risk of cardiovascular and respiratory complications. ⁽⁶⁾ Neuraxial anesthesia is a term used to describe any form of spinal or epidural (including caudal) anesthesia. ⁽⁶⁾ Selective involvement of sacral spinal segments (S2-S5) while saddle block results in minimum dilatation of vasculature with hypotension occurring only rarely. This beneficial activity of this block confirms its position as the safest anesthesia even at the centers with limited facilities in developing country ⁽⁷⁾ section 2.5 mg per 1 ml 0.25% and 5 mg per 1 ml 0.5%. ⁽⁸⁾

Aim of the study: To compare hemodynamic changes between the spinal block and saddle block in transurethral resection of prostate (TURP).

patients and methods:

A randomized clinical trial study was conducted in urological operation

theaters in Gazy Al-harrery hospital and Al-kademia teaching hospital in Baghdad, Iraq, from 1st of October 2018 to 1st of August 2019.

Fifty patients were included in the study. From each patient Written informed consent was obtained. Inclusion criteria: Age from 50-70; Weight from 50- 90 Kg; Height from 160-180 ; ASA I – II; Scheduled for TURP , Whilst the Exclusion criteria: Patient have allergy to drugs used in study and any absolute or relative contraindication to spinal anesthesia. A 50 patients were divided in two groups, group A 25 patients received spinal block and group B 25 patients received saddle block .Information's was taken from each patient about his name, Age, past medical history, past surgical history, drug history, height, weight, general examination was done and investigation was check.

In operating room monitors for patient's ECG, HR, spo2, blood pressure was connected. 18-gauge cannula was inserted for all patient and then they received 500 ml of crystalloid (0.9% normal saline) as preload. The patients was in sitting positioned and Under aseptic technique, a 25gauge sprotte needle used and 10 mg of 0.5% hyperbaric bupivacaine was given at the level of L₄₋₅ , L₃₋₄ interspaces after the free flow confirming of the cerebrospinal fluid (CSF). Now patients were divided in two groups, group A immediately positioned in the supine position with two pillows supporting the head and shoulders. Group B were maintained in the sitting position for 10 min. and then positioned in supine position with two pillows supporting the head and shoulders. For both groups O2 was given at rate of 3 lit/min by a nasal cannula. The BP was checked every 3 min. and baseline was recorded, a decrease of BP 25% from the baseline was treated with 100µg of phenylephrine.

Statistical analysis: The collected data was handled and analyzed by IBM© SPSS© (Statistical Package for the Social Sciences) Statistics Version 23. Chi-square was the test used for analyzing categorical data, with Fisher's exact modification when needed. Independent samples T-test and was used for

numerical and normally distributed data. All analyses were done with 95% confidence intervals (CI). P-values less than 0.05 were considered statistically significant throughout this study.

Results:

This study enrolled 50 males undergoing BPH resection by endoscopy. There was statistically insignificant differences regarding the patients age, height and weight between the two study groups.

Table (1): comparison of age and weight between spinal and saddle anesthesia

Variable	Spinal		Saddle		P-value
	Mean	SD	Mean	SD	
Age	65.31	7.750	69.33	5.241	0.239
Height	165.31	3.988	167.00	0.894	0.059
Weight	75.77	7.334	79.00	9.466	0.363

In the current study, the systolic blood pressure (SBP) showed a statistically significant difference intraoperatively, at 6 min, only, patients in spinal group had lower reading compared to saddle group B, in addition, as illustrated in figure (1); the SBP was more stable in saddle group.

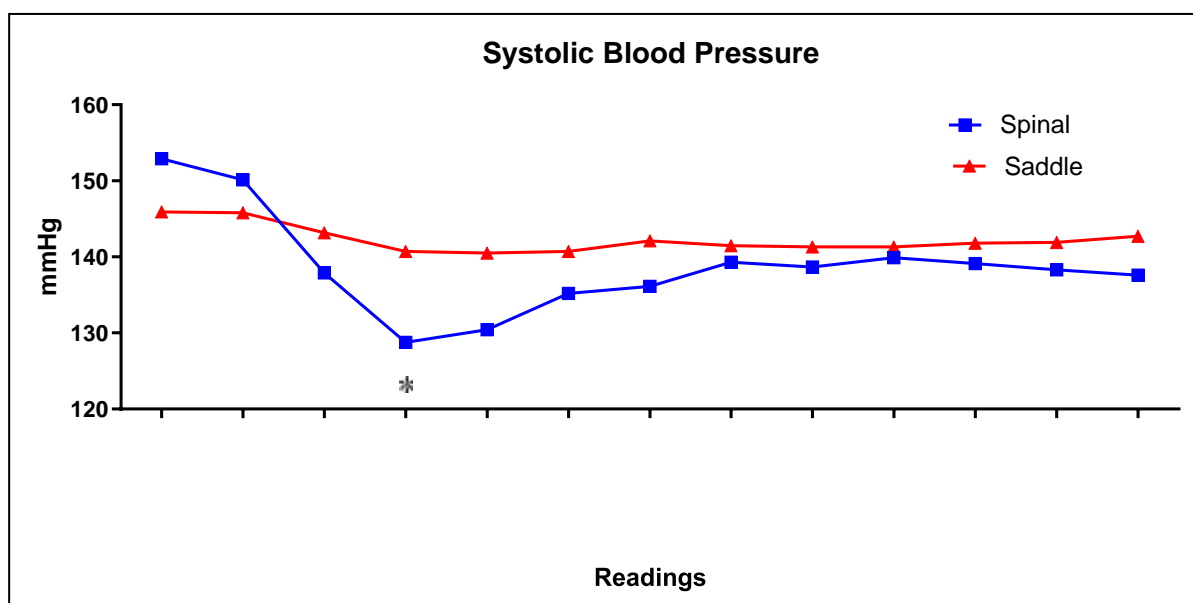


Figure (1): distribution of systolic blood pressure at different intraoperative time intervals according to study groups (the asterisk indicates statistically significant difference, p -value <0.05).

The diastolic blood pressure (DBP) showed statistically significant differences between the two study groups at time intervals; 3 min, 6 min, 9 min, 12 min, 21 min, 24 min, 27 min, 30 min and 35 min, as illustrated in figure (2), at all these intervals the DP+BP was lower in spinal anesthesia group.

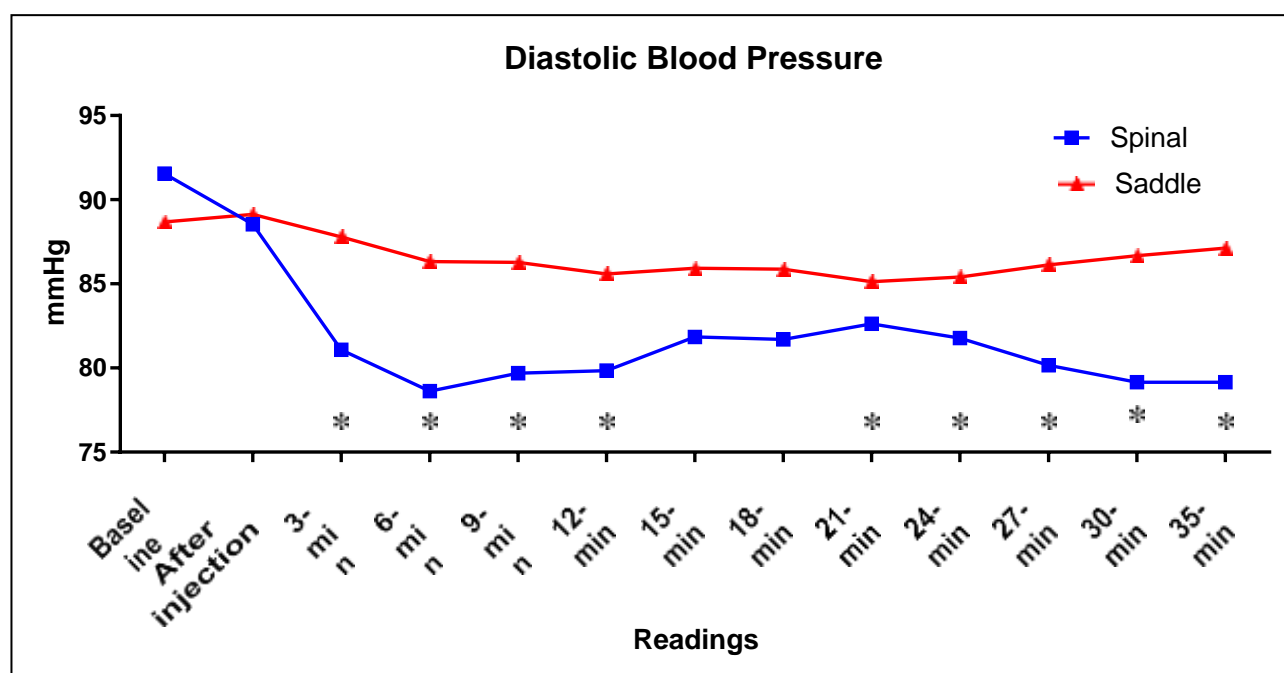


Figure (2): distribution of diastolic blood pressure at different intraoperative time intervals according to study groups (the asterisk indicates statistically significant difference, p -value <0.05)

The mean arterial pressure (MAP) showed statistically lower levels in spinal anesthesia group at 3 min, 6 min and 35 min, as illustrated in figure (3). It can be noticed that in saddle anesthesia group, the SBP, DBP and MAP were more stable in comparison to spinal anesthesia group.

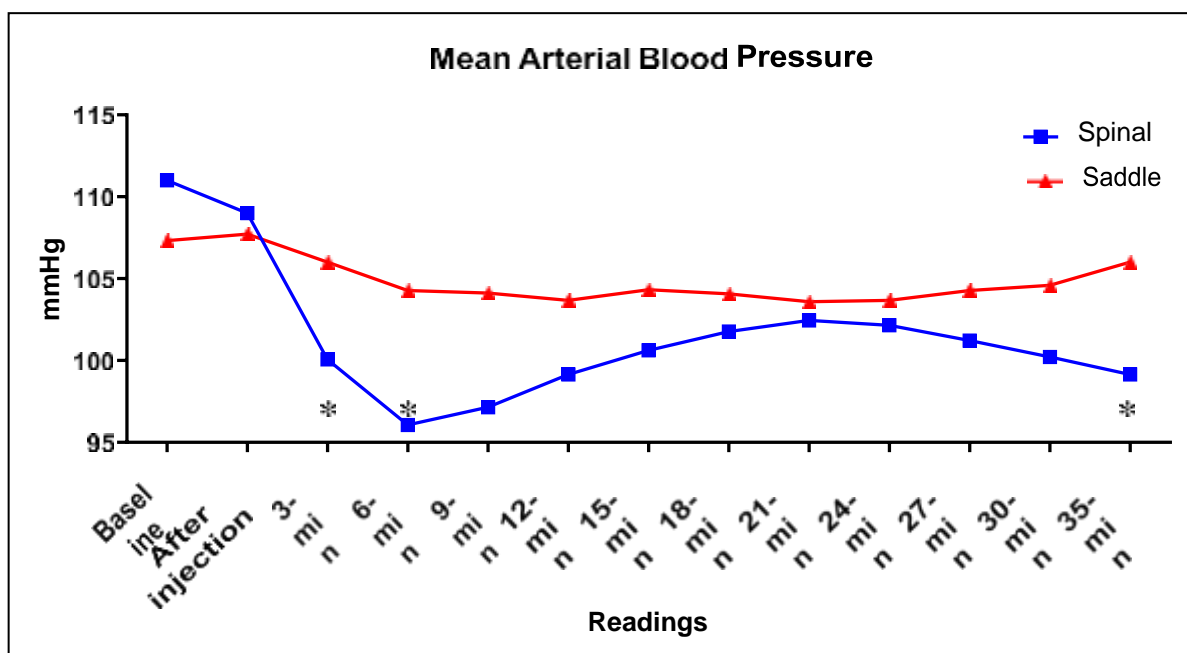


Figure (3): distribution of MAP at different intraoperative time intervals according to study groups (the asterisk indicates statistically significant difference, p -value <0.05)

The pulse rate was close in both groups, with only statistically significant difference at 21 min, as shown in figure (4).

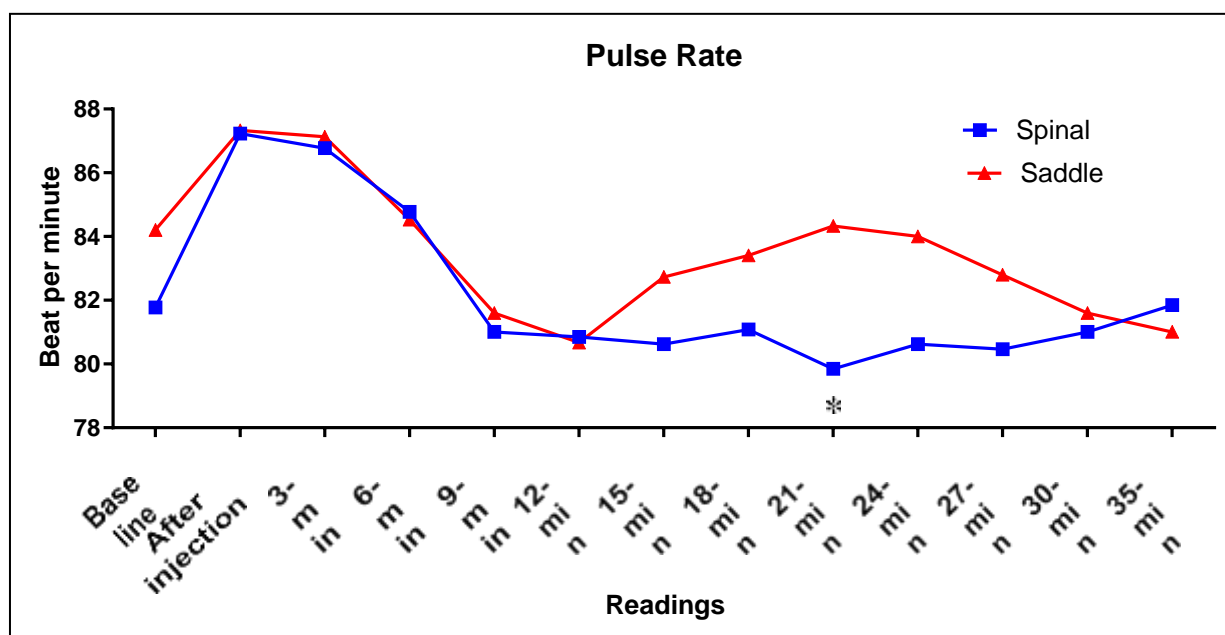


Figure (4): distribution of pulse rate at different intraoperative time intervals according to study groups (the asterisk indicates statistically significant difference, p -value <0.05)

The SPO2 levels was higher than 98% in all time intervals among both groups, and was only significantly higher in spinal anesthesia group at 3 min and 6 min, while it was higher in saddle anesthesia group at 15 min, as illustrated in figure (5).

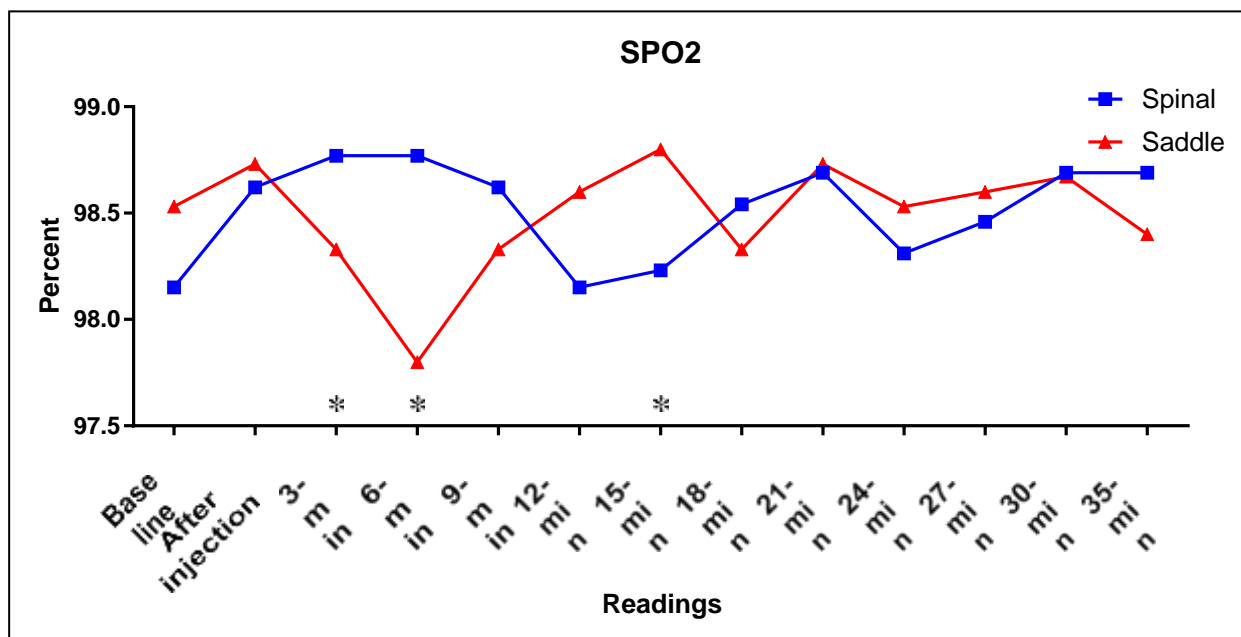


Figure (5): distribution of SPO2 at different intraoperative time intervals according to study groups (the asterisk indicates statistically significant difference, p -value <0.05)

There was a statistically significant association between type of anesthesia and the use of phenylephrine, as there were 12 (48%) patients who needed it in spinal anesthesia group compared to nil in saddle anesthesia group, also it was noted that most patients needed it on the sixth minute during the operation, as shown in Table (2).

Table (2): Distribution of the phenylephrine use according to study groups

Variable	Spinal	Saddle	Total	P-value
	No. (%)	No. (%)	No. (%)	
Phenylephrine use				
Yes	12 (48)	0 (0.0)	12 (24)	<0.001
No	13 (52)	25	38 (76)	

		(100)		
Total	25 (100)	25 (100)	50 (100)	
Fisher's exact test				

Discussion:

Regional anesthesia offers several advantages over general anesthesia for TURP. The reduction in intraoperative blood loss, decreases the hypercoagulable state in the postoperative period and maintain normal coagulation and platelet function; these benefits are believed to be due to modulation of the neuroendocrine response to tissue injury, change in the patient's mental status provides an early indication that excessive absorption of irrigating fluid has occurred, early detection of bladder perforation secondary to over distention with irrigation fluid or contact of the bladder wall with the surgeon's resectoscope. Conscious patients might experience symptoms related to perforation well before it becomes apparent to the surgeon, alerting the operating team early on. ^(7,8)

Spinal anesthesia and saddle block are adequate for TURP procedure in which the visceral pain sensation from the prostate and bladder neck is transmitted by afferent parasympathetic nerve fibers derived mostly from the second and third sacral nerve roots travelling with the pelvic splanchnic nerves.

Becker *et al.*, In his study Concluded that the most important factors that affect the distribution of the local anesthesia in cerebro-spinal fluid is the physical characteristics of the local anesthetic solution and the position of the patient ⁽⁹⁾, also various studies have already been done using 2 ml of 0.5% hyperbaric bupivacaine for TURP (Pitkanen *et al.*, 1984; Ozmen *et al.*, 2003) ^(10,11)

In current study the group A and group B both received 10 mg of hyperbaric bupivacaine (2 ml of 0.5%) but group A directly lying supine after injection and group B sitting for 10 min. then lying supine. In both groups the anesthesia was provides adequate anesthesia for the patients, in group A we note that hemodynamic changes more and statistically significant ($p < 0.05$) than group

B and so the vasopressor requirement more in group A.

current results supported by Bhattacharyya, Susmita *et al.*, (Incidence of hypotension and vasopressor requirement was less ($P < 0.01$) in patients received saddle block in compare to patients received spinal anesthesia in which both groups received 10 mg hyperbaric bupivacaine. Adequate surgical condition was achieved in both groups.)

Gujrala *et al.*, (saddle block done with 5mg of hyperbaric bupivacaine 1ml of 0.5% with 50 mcg fentanyl used in patients with mitral and aortic valve replacement and tricuspid annuloplasty for TURP without any deleterious cardiovascular effect.) ⁽¹²⁾

Also, some of the studies that support our study that noted that HR values decreases after the spinal anesthesia ^(13,14).

Conclusion: The hemodynamic changes and vasopressor requirement are less with saddle block, as well as Saddle block provide s adequate anesthesia for TURP procedure.

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