



Spinal Anaesthesia Using Taylors Lumbosacral Approach to Reduce the Incidence and Severity of Haemodynamic Side Effects in Patients Undergoing Transurethral Resection of Prostate

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Abstract

Hemodynamic side effect like bradycardia and hypotension are the most common undesired side effects during spinal anaesthesia. In 1940 Taylor described a SPA technique by a lumbosacral approach which caused less haemodynamic disturbances. The purpose of the present study was to compare the incidence and severity of haemodynamic side effects between a lumbar approach at L4/5 or Taylor's lumbosacral approach. 30 patients received SPA by a L4/5 approach and 30 patients by Taylor's approach.

Bupivacaine dose did not differ between groups. Onset of MLSB was faster (3.17+1.020 min vs 7.20+1.215, $p < 0.001$) in the lumbar group. Onset of motor block was faster (5.47+1.358 min vs 8.40+0.770) in lumbar group but duration of motor block did not differ between groups. The maximum decrease in heart rate was greater in lumbar group (27% vs 7%, p value 0.019). The maximum decrease in mean arterial pressure was also greater in the lumbar group (60% vs. 70%, p value 0.037). SPA with plain bupivacaine using Taylor's approach was associated with slower onset of MLSB and less haemodynamic disturbances compared to the classical lumbar approach at L4/5.

Introduction

Transurethral resection of prostate (TURP) is the gold standard surgical intervention for patients with benign prostatic hyperplasia (BPH), which causes urinary obstruction and increases the risk of urinary tract infection¹. The indications for TURP include many reasons like obstructive uropathy, bladder calculi, recurrent episode of urinary retention, urinary tract infection and haematuria². TURP can be performed under spinal anaesthesia or general anaesthesia, however the choice of anaesthetic technique for TURP is spinal anaesthesia as it offers many advantages

over general anaesthesia including stable haemodynamic variables, decrease blood loss and post operative pain, less chances of deep venous thrombosis after surgery, decrease post-operative confusion and faster recovery^{1,3}. Spinal anaesthesia is performed through midline, paramedian or Taylors lumbosacral approach⁴. Midline approach of spinal anaesthesia is the most commonly used technique but it has got limitations in patients who cannot flex adequately because of pain and ossified ligaments in old age. In these patients paramedian approach is very useful⁵. In 1940 Taylor described modified

paramedian approach (Taylor or lumbosacral approach) via L₅-S₁ space which causes less hypotension⁶. In 2006 Litz et al⁶ described spinal anaesthesia using Taylor lumbosacral approach reducing the incidence and severity of hemodynamic side effect in patient undergoing transurethral surgery. Kumkum Gupta et al⁸ in 2011 studied subarachnoid block with Taylors approach for surgery of lower half of the body and lower limb. Subarachnoid anaesthesia provided excellent operating condition with fewer side effect but patient with spinal deformity had technical difficulty to achieve successful block. Taylors approach provide reliable and less traumatic alternative to conventional spinal anaesthesia in patient with deformed spine. Considering all these merits of Taylor lumbosacral approach of spinal anaesthesia, the aim of our study was to compare the incidence and severity of hemodynamic side effect between lumbar approach at L₃-L₄ and Taylors lumbosacral approach at L₅-S₁ interspace in patient undergoing TURP.

Aims and Objectives

To compare the incidence and severity of hypotension between a lumbar approach at L₃-L₄ and Taylor's lumbosacral approach at L₅-S₁ interspace in patient undergoing TURP.

Material and Methods

After approval by the research and ethical committee and written informed consent of the patient, the study was carried out in ASA I and ASA II patients, aged between 30 -70 years, posted for TURP at IGMC, Shimla. The study was conducted in controlled prospective randomized manner from July 2018 to July 2019. The patients were assigned to their respective groups using random allocation software. ASA I and ASA II, diagnosed case of BPH, male patient aged between 30-70 years Scheduled for TURP were included in study. Patients refusal to participate in the study, ASA class III and above, hypersensitivity to local anaesthetic,

contraindication to spinal anaesthesia and patients on anticoagulant and antiplatelet drugs were excluded from study. Patients were divided into two groups Group C & Group T using random allocation software with 30 patients in each group receive conventional approach and Taylors lumbosacral approach of spinal anaesthesia with 3 ml of bupivacaine 0.5% hyperbaric solution respectively. All patients were preoperatively evaluated clinically, with routine investigations. Informed written consent to be taken from all patient included in the study. The patients were kept fasting for 8-10 hrs overnight and premedicated with tablet alprazolam 0.50 mg per orally night before surgery and 3 hour prior to surgery with sip of water. Patient was shifted to operation theatre, Intravenous access was secured and IV fluid started. Patients was monitored for heart rate (H.R), lead II electrocardiography (ECG), pulse oximetry (Spo₂) and non invasive blood pressure (NIBP) every 5 min during surgery. The patient was positioned in sitting position. After cleaning and draping, the allocated interspace was identified by palpation. Then 2ml of 2% plain lignocaine was infiltrated on the skin. The lumbar puncture was performed with 26 gauge spinal needle in the sitting position using midline approach at L₃-L₄ interspace for C group and L₅-S₁ interspace by using Taylors approach for T group. After identification of needle placement by free flow of cerebrospinal fluid, the subarachnoid block was established by administering 3 ml of 0.5% bupivacaine hyperbaric solution and patient was turned to the supine position and left in supine position for 10 minute. Onset of sensory block was assessed from the time of injecting drug into subarachnoid space till complete analgesia at the level of T-10 was achieved. Maximum Level of sensory block was checked bilaterally by pin prick method with 23 gauge hypodermic blunt needle and dermatomal level was tested every 2 min until the highest level was stabilized for four consecutive tests. The onset of motor block was assessed every 2 minutes till complete motor block was achieved as

per Modified Bromage Scale. The duration of motor block was taken as the time from complete motor block (Modified Bromage 1) to time when lower limb can be moved freely (Modified Bromage 6). Hypotension (mean blood pressure recording less than 20 % of baseline) if any patient were treated with help of intravenous fluid bolus and incremental doses of vasopressor agent mephentermine 6 mg i.v. Bradycardia (heart rate less than 20% of baseline) if occurs, it was treated

with injection atropine 0.6 mg i.v. Data collected was entered and analyzed in excel sheet, using appropriate statistical software and test of significance.

Results

Demographic distribution in two groups were similar with no significant difference as shown in table 1. Mean age (in years) in group C was 66.63+8.620 and in group T was 64.40+ 7.064.

Table 1: Demographic Data (Age Distribution)

Sr.No	Group of Patients	Age		
		Mean	S.D	p-value
1	C	66.63	8.620	0.27
2	T	64.40	7.064	

The onset of sensory block was delayed in the group T and this difference was found to be highly significant statistically (p< 0.001). Mean time to achieve maximum level of sensory block in group C was 5.70+1.022 and group T was 10.33+1.184. It was delayed in group T that come out to be highly significant statistically. Mean onset of motor block (in minute) in group T was 8.40+0.77

and in group C was 5.47+1.35. It was delayed in group T that come out to be highly significant statistically. Mean duration of motor block (in minutes) in group C and group T was 219.23+18.122 and 215.43+19.415 respectively. P value was 0.436 which was not significant statistically as shown in table 2.

Table 2: Comparison between group C and group T

Parameters	Mean + S.D		p-value
	C	T	
Onset of sensory block (in minutes)	3.17+1.020	7.20+1.215	0.000
Onset of motor block (in minutes)	5.47+1.358	8.40+0.770	0.000
Time to achieve maximum sensory level(in minutes)	5.70+1.022	10.33+1.184	0.000
Duration of motor block(in minutes)	219.23+18.122	215.43+19.415	0.436

The incidence of hypotension (mean blood pressure less than 20 % of baseline) in group C was 60 % and in group T was 30%. Therefore, this incidence of hypotension was found to be statistically significant between the two groups. (p-value < 0.05). The incidence of bradycardia

(Heart rate recording less than 20 % of baseline) was 27 % in group C patients and 7 % in group T patients. Therefore this incidence of bradycardia was found to be statistically significant between the two group. (p <0.05) as shown in table 3.

Table 3- Assessment of side effects

Parameter	Group C		Group T		p-value
	Number	%age	Number	%age	
Hypotension	18	60	9	30	0.019
Bradycardia	8	27	2	7	0.037

Discussion

Spinal anaesthesia is safe, reliable and inexpensive modality for transurethral resection of prostate with the additional advantage of providing stable hemodynamics, decreased blood loss, prolonged post operative pain relief, less chances of deep vein thrombosis after surgery, decreased postoperative confusion and faster recovery³. As Most of patients are elderly with multiple co-morbidities, increased hemodynamic alterations are expected in patients undergoing transurethral resection of prostate under subarachnoid block³. Our study compared to study conducted by Litz et al⁶, who found that the incidence of hypotension was greater in lumbar group than Taylor group. Incidence of hypotension in lumbar group was $14.9 \pm 8.6\%$ and in Taylor group was $10.5 \pm 8.3\%$. The difference was found to be statistically significant (p value less than 0.001). Maximum decrease in heart rate in lumbar group and Taylor group was $16.7 \pm 11.8\%$ and $9.4 \pm 9.9\%$ respectively. The difference was found to be statistically significant (p value less than 0.001). K.H. Olsen et al⁸ in 1990 while comparing spinal analgesia with plain 0.5% bupivacaine administered at spinal interspace L2-L3 or L4-L5 found that incidence of hypotension in both group was 8% and not found to be statistically significant.

Conclusion

Taylor's approach of spinal anaesthesia was associated with delay in the onset of sensory block and motor block along with slower time for maximum level of sensory block and lesser incidence of hypotension and bradycardia. We observed that the Taylor approach of spinal anaesthesia in TURP patients was associated with less hemodynamic side effect. Thus we concluded that Taylor's approach of spinal anaesthesia is superior to conventional approach of spinal anaesthesia for patient undergoing transurethral resection of prostate with decreased incidence and severity of hemodynamic side effect

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