ORIGINAL RESEARCH PAPER

Anaesthesiology

KEY WORDS:

A COMPARATIVE STUDY OF TWO DOSES OF SPINAL BUPIVACAINE WITH FENTANYL IN ELDERLY PATIENTS UNDERGOING ENDOSCOPIC UROLOGIC PROCEDURES

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ABSTRACT

Aim of the study; The aim of the study is to find out the minimum effective dose of bupivacaine with 25µgm of fentanyl for spinal anaethesia in elderly patients undergoing endoscopic urologic procedures.

Materials and methods; After getting the approval from the ethical committee,the study was conducted in a tertiary care hospital. 75 patients aged between 50 to 75 years undergoing elective endoscopic urologic procedures. Patients were randomly divided into three groups of 25 patients in each group. Group-B received injection 0.5%Bupivacaine 1.5cc, Group-F1received injection 0.5% Bupivacaine1cc, plus injection fentanyl 0.5cc = 1.5cc and Group-F2 received injection bupivacaine0.8cc plus injection fentanyl 0.5cc plus sterile water 0.2cc = 1. 5cc.The following parameters were recorded. Time of highest level of sensory block, Degree of motor blockade, vital parameters. Sedation score and incomplete sensory block were also recorded. Post-operative observation like Duration of procedure, sensory level at the end surgery, duration of post-operative analgesia and two segment regression time were recorded.

RESULTS; In Group-B 28% of the patients had significant hypotension who needed bolus Intra venous fluids and vasopressors. InbGroup-F1 the haemodynamics were stable with significant prolongation of post-operative analgesia than other groups. In Group-F2 8% of the patients had intra operative discomfort who needed supplemental intravenous analgesia.

Conclusion: From this study, it was concluded that addition of fentanyl 25µgm to 5mg of 0.5%Bupivacaine provides reliable and satisfactory surgical anaesthesia with an ideal peak sensory block height, stable haemodynamic status and without any significant adverse effect in elderly patients undergoing endoscopic urologic procedures.

INTRODUCTION

Spinal anesthesia is the most frequently employed anaesthetic technique for "TURP" and other cystoscopic urologic procedures. It provides an adequate anesthesia for the patient and good relaxation of the pelvic floor and perineum for the surgeon.

The advantages of neuraxial opioids over neuraxial local anaesthetics are that it produces prolonged, intense and selective segmental analgesia without motor blockade and sympathetic dysfunction.

Opioids and local anaesthetics are administered together have a potent synergistic analgesic effect. Intrathecal opioids enhance analgesia from sub therapeutic dose of local anaesthetics and make it possible to achieve successful spinal anaesthesia using otherwise inadequate dose of local anesthetic.

Hence the present study has been under taken to combine "fentanyl" a potent synthetic opioid and "Bupivacaine" a long acting local anesthetic for intra thecal administration to provide anaesthesia for Endoscopic urological procedures in elderly patients.

AIM OF THE SUTD : The aim of my study is to find out the minimum effective dose of bupivacaine with 25ug of fentanyl for spinal anesthesia in elderly patients undergoing endoscopic urologic procedures.

MATERIALS AND METHODS

After getting the approval from the ethical committee, the study was conducted in a tertiary care hospital. The study was conducted in 75 patients aged 50-75 years undergoing elective endoscopic urologic procedures. After getting consent and explaining the procedure details, the anaesthetic technique was performed .The exclusion criteria were patient refusal, ASA III & IV patients**,** Post spinal surgeries, Spinal deformity and history of drug allergy.

PREOPERATIVE PREPARATION:

After routine, preoperative assessment as for all elective surgery patients they were premedicated with injection Midazolam 2mg intra muscularly, 30-45 minutes before surgery. Patients were randomly divided into three groups.

Group B - Received Injection 0.5% Bupivacaine 1.5cc

Group FI - Received Injection 0.5% Bupivacaine 1cc + Injection fentanyl 0.5cc = 1.5cc

Group FII - Received Injection Bupivacaine 0.8cc + Injection. Fentanyl 0.2cc = 1.5cc

PROCEDURE DETAILS:

On preoperative visit, the patients were explained about the procedure details. Then preoperative baseline parameters like pulse rate, blood pressure, respiratory rate was recorded. Iv line started with 18-gauge intra venous cannula and infused with crystalloids.

After preparing the emergency drugs and equipment's, the operating room was kept ready before anaesthesia intervention. Patients were put in right lateral position and with strict aseptic precaution lumbar puncture was done with quincke standard 23-gauge spinal needle.

After ensuing free flow of CSF, drug was injection as per the group assigned. The assignee amount of fentanyl and sterile water were taken in a sterile tuberculine syringe. After injection, patients were put up in supine position. After attaining adequate peak level of sensory block, the patient was put up in lithotomy position. If needed oxygen was given through ventimask.

THE FOLLOWING PARAMETERS WERE RECORDED

1. Time of highest level of sensory block achieved by pin prick and temperature.
2. Degree of motor blockade was assessed by using Bromage scale.
3. Vital parameters were monitored every 2 minutes for 10 minutes and every 5 minutes till the end of surgery.
4. Adverse effects like nausea, vomiting, pruritus and shivering.
5. Sedation score
6. Incomplete sensory block
7. Post-operative observation: Duration of procedure, level at the

end of surgery, duration of post-operative analgesia, two segment regression time (i.e. the time taken to decrease from maximum sensory level by two segments from initial level is noted)

SEATION SCORE:

Brain and Ready sedation score was employed

0 - Fully awake
1 - Drowsy
2 - Drowsy but arousable on touch (or) call
3 - Drowsy but arousable on deep stimuli
4 - Somnolent

In the post-operative period total duration of analgesia was taken as that period from time of subarachnoid block till patient requirement of analgesic medicine.

MOTOR BLOCK WAS ASSESSED BY BROMAGE SCALE:

0- Full flexion of knees, feet, able to lift the extended leg
1– Unable to lift the extended leg. Just able to fled the knees and full flexion of feet possible
2- Unable to flex the knees but flexion of feet possible
3– Unable to move the leg (or) feet

Also in the post-operative period, all patients were followed up for any complications like post-operative nausea, vomiting, pruritus hypotension and respiratory depression.

Statistical significance was brought out by ANOVA table

RESULTS

B. Intra operative observation

Table 1: Maximum Sensory Level

Maximum Sensory level	Cases in					
	Group B		Group F1		Group F11	
	No.	%	No.	%	No.	%
T6	1	4	-	-	-	-
T7	2	8	-	-	-	-
T8	1	4	5	20	2	8
T9	9	36	10	40	4	16
T10	10	40	8	32	19	76
T11	2	8	2	8	-	-
Total	25	100	25	100	25	100
Mean	9.24		9.28		9.68	
S.D.	1.2		0.89		0.63	
'p'	0.1243 Not significant					

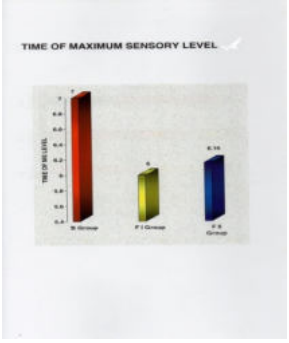
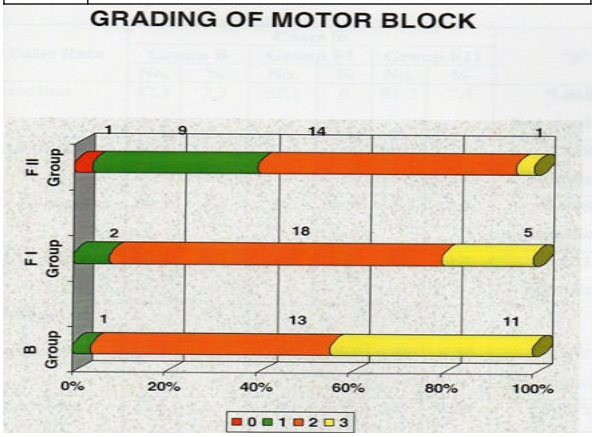


Table 2: Maximum Sensory Level

Maximum Sensory level	Cases in		
	Group B	Group F1	Group F11
Rang	5-9	5-8	5-7
Mean	7.0	6.0	6.16
S.D.	1.15	0.91	0.8
'p'	0.0021 Significant		

Table 3: Grading of Motor Block

Motor Block Grade	Cases in					
	Group B		Group F1		Group F11	
	No.	%	No.	%	No.	%
1	-	-	-	-	1	4
2	1	4	2	8	9	36
3	13	52	18	72	14	56
4	11	44	5	20	1	4
Total	25	100	25	100	25	100
Mean	2.4		2.12		1.6	
S.D.	0.58		0.53		0.65	
'p'	0.0001 Significant					



B. Intra operative haemodynamic changes

Table 4: Changes in Systolic B.P.

Systolic B.P.	Cases in						'P'
	Group B		Group F1		Group F11		
	No.	%	No.	%	No.	%	
Base line	120.4	14.85	123.2	11.08	124.4	8.7	0.2972 Not Significant
At 5 minutes	105.64	17.77	117.2	12.08	117.6	8.79	0.0012 Significant
At10 minute	110.3	10.69	116.4	9.95	115.6	11.58	0.0961 Not Significant
At 15 minutes	111.2	10.92	116.4	9.95	118.4	9.43	0.0501 Not Significant
Changes at							
5 minutes	-17.76	14.45	-6	10	-6.8	8.52	0.0006 Significant
10 minutes	-10.08	10.96	-6.8	7.48	-8.8	10.13	0.4863 Not significant
15 minutes	-9.2	8.62	-6.8	9.45	-6	7.07	0.3769 Not significant
% of changes at							
5 minutes	-14.62	11.63	-4.65	7.94	-5.28	6.63	0.0002 Significant
10 minutes	-7.84	8.59	-5.35	6.08	-7.04	8.11	0.2302 Not significant
15 minutes	-7.19	6.63	-5.2	7.46	-4.7	5.57	0.1931 Not significant

Table 5: Sedation Score

Sedation Score	Cases in					
	Group B		Group F1		Group F11	
	No.	%	No.	%	No.	%
0	22	88	2	8	3	12
1	3	12	16	64	16	64
2	-	-	5	20	6	24
3	-	-	2	8	-	-
Total	25	100	25	100	25	100
Mean	0.12		1.28		1.12	

S.D.	0.33	0.74	0.6
'p'	0.0001 Significant		

Sedation Score was more in Fentanyl group

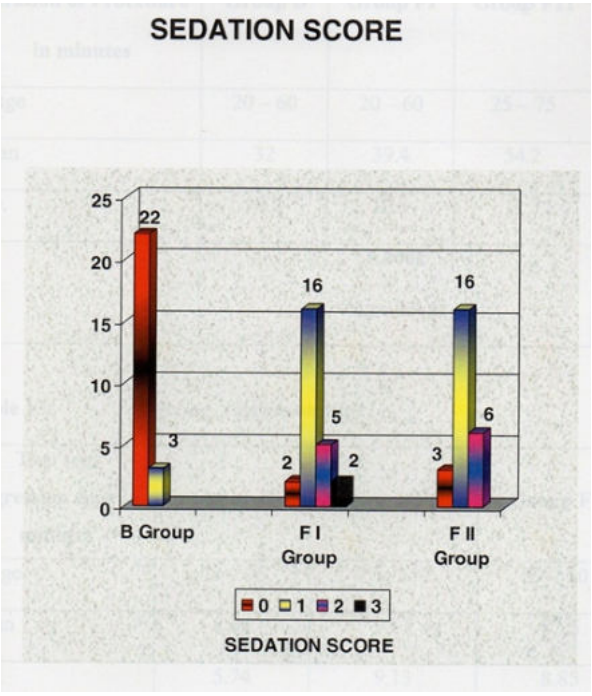


Table 6: Time to two segment regression time

Two segments Regression time in minutes	Cases in		
	Group B	Group F1	Group F11
Range	78-95	77-17	69-101
Mean	85.8	95.7	82.5
SD	5.74	9.13	8.85
'p'	**0.0001Significant**		

Two Segment regression time was significantly prolonged in group-FI (P-0.0001)

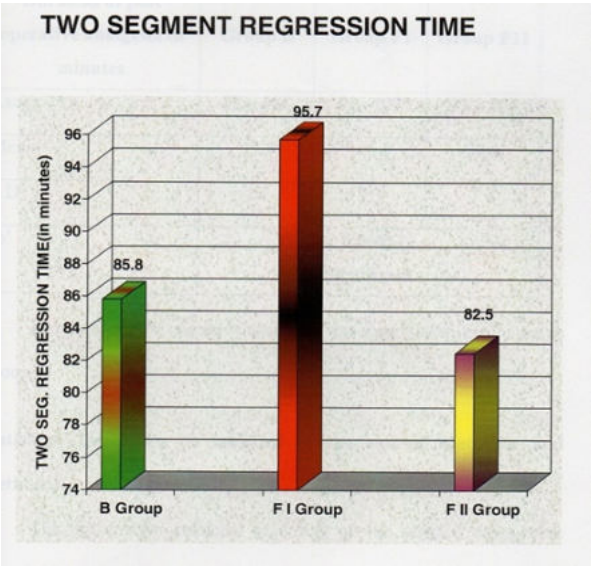
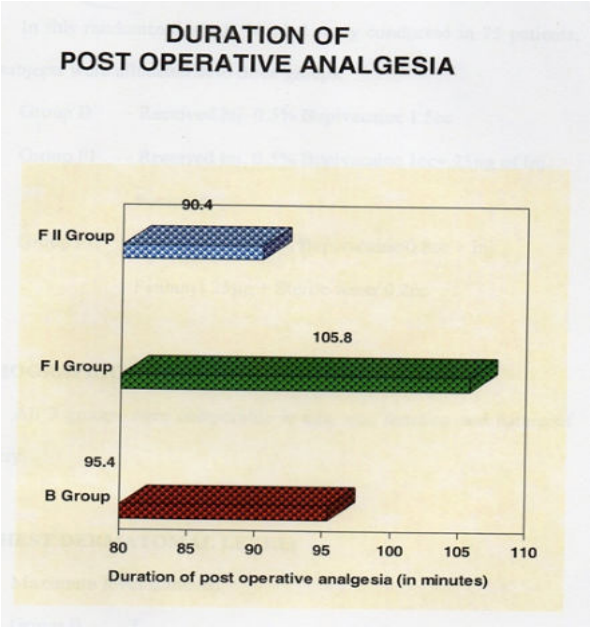


Table 7: Duration of postoperative analgesia

Duration of postoperative analgesia in minutes	Cases in		
	Group B	Group F1	Group F11
Range	85 – 108	92 – 127	75 – 105
Mean	95.4	105.8	90.4
SD	4.4	9.3	7.8
'p'	**0.0001 Significant**		



Duration of postoperative analgesia was significantly prolonged in Group FI

Statistical Tools (To be included at the end of Materials and Methods)

The information collected regarding all the selected cases were recorded in a Master Chart. Data analysis was done with the help of computer using **Epidemiological Information Package (EPI 2002).**

Using this software, range, frequencies, percentages, means standard deviations, chi square and 'p' values were calculated. Kruskul Wallis chi-square test was used to test the significance of difference between quantitative variables. A 'p' value less than 0.05 is taken to denote significant relationship.

OBSERVATION AND RESULTS

In this randomized single blinded study conducted in 75 patients. The subjects were allocated in to three groups.

Group B - Received Injection 0.5% Bupivacaine 1.5cc

Group FI - Received Injection 0.5% Bupivacaine 1cc+25 µg of Injection.

Group FII - Received Injection 0.5 % Bupivacaine 0.8cc + Injection. Fentanyl 25 µg + Sterile water 0.2cc.

DEMOGRAPHIC DATA

All 3 groups were comparable in age, sex duration and nature of surgery.

HIGHEST DERMATIONAL LEVEL

Maximum level achieved

Group B - T_9

Group FI - T_9

Group FII - T_{10}

TIME TO HIGHEST DERMATOMAL LEVEL:

Group B - 7 minutes with SD of 1.15

Group FI - 6minutes with SD of 0.91

Group FII - 6.16minutes with SD of 0.8

GRADING OF MOTOR BLOCK

Group B - 44% of patients had grade 3
- 52% of patients had grade 2
- 4% of patients had grade 1

Group FI - 22% of patients had grade 3
- 56% of patients had grade 2
- 36 % of patients had grade 1
- 4 % of patients had grade 0

HAEMODYNAMIC VARIABLE:
With regard to blood pressure more than 30% free from the base line value was considered hypotension

Group B - 25% of patients had significant hypotension

Group FI - There was no significant fall in blood pressure

Group FII - There was no significant fall in blood pressure

Considering their groups plain bupivacaine group had significant hemodynamic impairment when compared to Fentanyl group, and they required intravenous fluids, Injection. Ephedrine and oxygen supplementation, Of the 2 fentanyl groups none had significant changes in hemodynamic parameters.

INCOMPLETE SENSORY BLOCK:
In group FII 8% of patients had incomplete sensory block and they felt discomfort during the surgical procedure. They were supplemented with Injection. Propofol 1mg/kg + Injection fentanyl 1µg/kg intravenously and oxygen.

SEDATION:
Intra operative sedation was excellent in group FI & Group FII

In Group B - 88% had sedation score of 0
12% had sedation score of 1

In Group FI - 8% had sedation score of 0
64% had sedation score of 1
20% had sedation score of 2
8% had sedation score of 3

In Group FII - 12% had sedation score of 0
64% had sedation score of 1
24% had sedation score of 2

TWO SEGMENT REGRESSION TIME:
Duration of analgesia as measured by two segment regression time in Group B was 85.8minutes with SD of 5.74, Group FI was 95.7 minutes with SD of 9.13, Group FII was 82.5mts with SD of 8.85

TOTAL DURATION OF ANALGESIA:
Total duration of pain free interval in Group B was 95.4mts with SD of 4.4, Group FI was 105.8mts with SD of 9.3, Group FII was 90.4mts with SD of 7.8

COMPLICATIONS:
Nausea and vomiting was not found in all groups. Pruritus developed in Group FI -24% of patients, in Group FII -16% of patients. All responded to Injection Chlor pheniramine maleate IM.

DISCUSSION
Most of the cystoscopic urological procedures are performed under subarachnoid block the utility and safety of intrathecal opioids for pain relief is of important clinical concern.

This study combined Fentanyl with low dose of local anaesthetic aimed to delineate the safe limit of local anesthetic that could be added to Fentanyl for elderly patients undergoing endoscopic urological procedures without much untoward effect.

INTRA OPERATIVE COMFORT:
Addition of Opioid aids in relieving the discomfort that could be caused by visceral handling .8% of patients in group FII felt discomfort during the surgery and they needed intravenous analgesic supplement otherwise all patients were comfortable. All patients in fentanyl group were comfortable in lithotomy position though the motor block was low.

HAEMODYNAMICS:
The haemodynamics were stable in fentanyl group than plain bupivacaine group (0.00012) .28% of group B had hypotension. This is in concordance with the study conducted by A Kararmaz et al (1)

SEDATION:
In fentanyl group most of the patients were sedated well with a sedation score of more that 1 (**P 0.00013**) than plain bupivacaine group.

PRURITIS:
The incidence of pruritis in group FI is 24% and in group FII is 16%. Nausea and vomiting was not found in any of the three groups.

TWO SEGMENT REGRESSION TIME:
Two segment regression time was significantly prolonged in Group F1 **"p" 0. 0001.The** above observation is similar to the study conducted by Prof Naveen Malthotra et al, (3) and Ben David et al (11).

DURATION OF POST OPERATIVE ALALGESIA:
The duration of post-operative analgesia was significantly prolonged in Group F1(" **P" 0.0001).**

RESPIRATORY DEPRESSION:
Previous studies by Bromage et al (14) in 1981, Lan et al 1983 Showed that fentanyl up to 25µg did not cause delayed respiratory depression. They concluded that respiratory depression effect is dose dependent and it is unlikely to occur at a dose below 25µg.
In this study, the respiratory rate remained unchanged with the base line. This study delineates the optimal does of Bupivacaine and Fentanyl without much morbidity in hospital with moderate post-operative care.

CONCLUSION
From this study, it was concluded that addition of Fentanyl 25µg to 5mg of 0.5% Bupivacaine provides reliable and satisfactory surgical anaesthesia with an ideal peak sensory block height, stable hemodynamic status and without any significant adverse effects in elderly patients undergoing endoscopic urologic procedures

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