Original article:

Comparison of combined spinal and general anaesthesia versus general anaesthesia alone for lumbar spine surgery

*** VISHNU A. TIDKE, ** NALE S.R ***RAWAT H.S , ****SHEKHAR G. ANEY**

* Resident, ** Assist. Prof. *** Prof & HOD Dept. Of Anaesthesiology**** Resident
Dept. Of Anaesthesiology, DVVPF's Medical College and Hospital Ahmednagar.414111
Corresponding author **

ABSTRACT:

Background and aim: There are many surgeries performed on lumbar spine. They include laminectomy, discectomy, fixation of spine by instrument etc. . The peculiarities of these type of surgeries are that the patient is in prone position[1] , the operative field is near a valve less venous plexus (Batson plexus) [1] , the surgeons demand for hypotension to give clear operative field and intense post operative pain relief . This randomized, double blinded study was carried out to assess the quality of anaesthesia , patient comfort & surgeons response during the spinal surgery under general anaesthesia alone and combined spinal with general anaesthesia. [5] [6] [7]

Materials and methods: A total of 40 patients scheduled for elective lumbar spine surgeries were randomly assigned into two groups: Group 'A' include surgeries performed under general anaesthesia. Group 'B' include surgeries performed under combined spinal & general anaesthesia. All Patients were given tablet Alprazolam 0.5mg on night before the surgery. An 18G intracath with IV drip of RL started 2 hr before surgery. Inj Tranexamic acid IV 15-20mg/kg given 30 min prior to surgery. Following parameters are studied and compared : (1)Total dose of NTG , Dextomed,Fentanyl, (2) Recovery time(3) Surgeons satisfaction(4) Patients response to pain relief (5)Complications in the form of hypotension, hypertension, bradycardia , PONV.(6) Blood loss.

Results: Both groups were similar with respect to demographic data. Group with combined SA and GA was found to be more effective measure for achieving intraoperative hypotension and postoperative pain relief with fewer side effects than group with GA alone.

Conclusion: Combining two techniques spinal anaesthesia and general anaesthesia for spinal surgeries reduces the stress of anaesthesiologist, surgeon and patient. Overall quality of anaesthesia is markedly good in providing clear and blood less operative field to the surgeon intraoperatively and complete postoperative pain relief to patient.

Keywords: Spine surgery, Hypotension, pain relief, blood loss.

INTRODUCTION:

Patient presenting for surgical procedures of the spine are a diverse population undergoing a wide variety of operative procedures and present diverse challenges to the anaesthesiologist. The anaesthetic management depends on the operative site, spine pathology, surgical approach and the anaesthesiologists experience & expertise. There are many surgeries performed on lumbar spine. They include laminectomy, discectomy, fixation of spine by instrument etc.

The peculiarities of these type of surgeries are that the patient is in prone position. [1] Potential problems with the prone position are summarized as below;

Problems with the prone position	
Potential problem	**Comments**
Eyes • Corneal abrasion • Optic neuropathy • Retinal artery occlusion	 • Ensure eyes taped shut • Increased intraocular pressure leads to decreased perfusion pressure Reduce risk by avoiding compression to the eyes, hypotension, low haematocrit • Avoid pressure on the eyes
Abdominal compression • Impaired ventilation	 • Avoid abdominal compression as far as possible
Damage to major vessels • Aorta or inferior vena • Iliac vessels	• Accidental damage following perfor- ation of anterior longitudinal ligament produces major bleeding into wound, and presents with acute reduction in blood pressure • Less acute presentation. High index of suspicion to avoid delayed diagnosis.

As the operative field is near a valve less venous plexus (Batson plexus) [1], the surgeon demands for hypotension to get clear and bloodless operative field and intense postoperative pain relief. Controlled, or deliberate, hypotension has been used for many years as a means of reducing intraoperative blood loss and facilitating surgical exposure. Reduced intraoperative blood pressure leads to a direct reduction in bleeding from surgically injured arteries and arterioles. Venous dilation, in turn, decreases venous bleeding, especially from cancellous bony sinuses that do not collapse when transected. Decreased bleeding improves surgical visualization of the wound, resulting in faster surgeries (in some series) and, thus, further reducing transfusion dependence. Anecdotal reports describing this technique have been published since the 1970s. [2,3] All these factors make this surgery different. There are various techniques of anaesthesia used for such cases. These are – general anaesthesia , spinal anaesthesia & epidural anaesthesia.[4] Here we have combined spinal anaesthesia with general anaesthesia, and compared the quality of anaesthesia , requirement of various drugs intraoperatively (to achieve hypotension thereby bloodless operative field and pain relief) & surgeons response during the spinal surgery with surgery done under general anaesthesia alone . [5] [6] [7]

MATERIALS AND METHODS:

The study was conducted at Department of Anaesthesiology & Critical Care, DVVPF's Medical College & Hospital, Ahmednagar. After

getting approval from the institutional ethical committee, an informed consent was taken from every patient enrolled in the study. A total of 40 patients posted for different lumbar spine surgeries satisfying the inclusion criteria were selected.

Group 'A'- Surgeries performed under General anaesthesia.
Group 'B' – Surgeries performed under combined spinal & general anaesthesia.

SELECTION OF CASES:

I . Inclusion Criteria:

1. Patients scheduled for elective spine surgeries.
2. Age between 20 to 65 years of both the sexes.
3. Patient with ASA Grade I & II.

II . Exclusion Criteria:

1. Emergency surgeries.
2. Patient with IHD , Valvular heart disease & arrhythmia.
3. Patient having allergy to any drug.

ANAESTHESIA TECHNIQUE:

The following procedure was carried out.
ASA Grade I & Grade II patients are selected. Written informed valid consent obtained. patient kept nil by mouth for more than 6 hrs is confirmed. Patients were given tablet Alprazolam 0.5mg at 10 PM night before the surgery. An 18G intracath with IV drip of RL started 2 hr before surgery. Inj Tranexamic acid IV 15-20mg/kg given 30 min prior to surgery. Patient was taken on operation table. Multipara monitor consisting of ECG ,NIBP,SPO2, EtCo2, temperature probe was connected to patient. Inj Ondansetron 4mg + inj Glycopyrrolate 0.2mg given IV half hr prior to surgery.
Following anaesthesia technique is selected
Group 'A':- General anaesthesia is chosen as the technique. Premedicated with 1mg Midazolam & inj Fentanyl 1µg/kg IV. Patient is preoxygenated with 100% oxygen for 3 min. Patient induced with Inj.Propofol 1 to 2.5 mg/kg IV **.** Relaxant used is inj. Atracurium 0.5 to 0.7 mg/kg IV (intubating dose), intubated with ETT No 8.0 in male & 7.0 in female. Intraoperative anaesthesia maintained with 50% O2 +50% N20 + Isoflurane on closed circuit with IPPV on Datex Ohmeda M904E.
Group 'B' :
Technique used was combination of spinal anaesthesia and general anaesthesia , [8]
Initially; patient put in sitting position. Painting & Draping done. L2L3 inerspace selected.
Subarachnoid space is reached with spinal needle no 25G and free flow of CSF is confirmed.
Drug injected :- 3ml of 0.5% Bupivacaine(hyperbaric) + Inj Clonidine 30 mcg [9] [10]

Patients were immediately made supine and the table height was adjusted to reach a spinal level of T6. Onset of sensory anesthesia was checked with pin prick, and motor block assessment was carried out with modified Bromage scale. A waiting period of 20 min or time for maximal spinal action, whichever occurred earlier, was allowed to pass before GA induction. Any cases of failed SA were managed by giving GA and excluded from the study.

www.ijbamr.com P ISSN: 2250-284X , E ISSN : 2250-2858

GA ; - Patient is premedicated with Inj Midazolam 1 mg and Inj Fentanyl 1 µg/kg IV . All patients were preoxygenated with 100% oxygen for 3 min. Induction done with Inj Propofol 1 to 2.5 mg/kg IV. [11] Relaxant used is Inj. Atracurium 0.5 to 0.7 mg/kg . Intubation done under direct laryngoscopic vision with ETT No 8.0 in male & 7.0 in female .Anaesthesia is maintained with 50% O2 +50% N20 + Isoflurane on closed circuit of Datex Ohmeda M904E.

Monitoring:

On arrival to the operation theatre all patients were connected to multipara monitor with pulse oximetry, NIBP, ECG. After pre-oxygenation with 100% O_2 for 3 min, anesthesia was induced with a standard anesthetic protocol mentioned above. Systolic, diastolic, mean arterial blood pressures and heart rate were recorded at the following points of time:

1. At 10 min ,after arrival to the operation theatre ,(Baseline Reading)
2. At 20 min after arrival and on Induction of general anaesthesia.
3. Every 10 min, from induction of anaesthesia till extubation.

Following parameters are studied in addition to basic monitoring (heart rate, blood pressure , oxygen saturation) ;-

1. Surgeons satisfaction by numeric rating scale (NRS) From 1-10 (10 indicating best possible field)
2. Total dose of NTG, Dextmeditomedine, Fentanyl.
3. Recovery time (time lapse between closure and extubation)
4. Blood loss
5. Complications in the form of hypotension , hypertension , bradycardia , PONV.
6. Patients response regarding Postoperative pain relief by Visual analogue scale (VAS) from 0 to 10 (0 indicating no pain and 10 indicating maximum pain).

The results obtained in the study are presented in tabulated manner. The primary outcomes of our study were; Systolic blood pressure, diastolic blood pressure, mean arterial pressure, heart rate. The secondary outcomes were; surgeons response, drugs used intra operatively, blood loss, recovery time .patients response to pain relief.

Statistical presentation and analysis of the present study were conducted, using the mean, standard deviation, Chi-square, paired t-test and unpaired t-test with windows Microsoft excel software.

RESULTS:

There were no significant differences between the two groups with regard to demographic data such as age, sex and weight (Table 1). There was no significant statistical difference between the two groups of patients regarding HR, SBP, DBP, and MAP before intubation (baseline values of Tables 2-5). Systolic blood pressure, diastolic blood pressure and mean blood pressure were also comparable in both groups after intubation, increased slightly and then decreased significantly intraoperatively compared to baseline values but this fall in blood pressure in group A was achieved with higher requirement of Isoflurane , NTG, and Dexmeditomedine compared with group B (Table 7, Tables2-4). Surgeons satisfaction by NRS is higher in group B along with less recovery time , less blood loss. Patient's response regarding post operative pain relief by VAS is higher in Group A patient compared to group B in which none of the patient had post operative pain. (Table 6). Three out of 20 patients suffered from bradycardia in group B which was managed inj Atropine

www.ijbamr.com P ISSN: 2250-284X , E ISSN : 2250-2858

0.6 mg IV. Incidence of post operative nausea, vomiting, sedation and shivering was less in group B as compared to Group A.

None of the patient showed any evidence of ischemia or arrhythmia intraoperatively.

Table 1: Demographic data

Forty eligible patients were enrolled for our study, with 20 in each group. The groups were comparable to each other with respect to the demographic profile. [Table 1]

	Group A (n-20)	Group B (n= 20)	p-value
Sex			
• **Male**	10(50%)	11(55%)	0.87
• **Female**	10(50%)	9(45%)	
• **Age(years) (Mean ± SD)**	46.5±11.81	46.3±12.22	0.49
• **Weight(kg) (Mean ±SD)**	50.3±7.05	51.1±2.95	0.30

Table 2 : Changes in systolic blood pressure.

	Changes in systolic blood pressure.		
Time (min)	**Group A**	**Group B**	**P value**
10min(Baseline)	129.7±14.2	134.2±11.04	0.135
20 min	115 ±20	123±19.4	0.11
30 min	105.3±11.87	113.9±22.01	0.066
40 min	95.2±9.041	100.6±11.79	0.058
50 min	93.85±9.986	94.35±10.68	0.44
60 min	95.45±11.42	92.8±8.063	0.201
70 min	93.1±7.813	93.15±7.768	0.492
80 min	91.4±7.401	92.8±6.598	0.266
90 min	96.5±15.52	90.95±6.7	0.077
100min	94.25±8.552	90.7±5.172	0.061
110 min	94.6±6.557	91.45±6.755	0.071
120 min	92.3±4.473	90.3±5.704	0.113
130 min	95±6.096	95.75±9.239	0.382
140 min	94.9±10.44	96.5±13.75	0.355
150 min	93.4±11.009	91±12.348	0.5

Baseline average systolic blood pressure was comparable in both groups. It was observed that , intraoperative systolic blood pressure fall significantly compared to baseline values but There was no significant difference (p-value >

www.ijbamr.com P ISSN: 2250-284X , E ISSN : 2250-2858

0.05) in average systolic blood pressure of two groups. [Table 2] However to achieve this fall in systolic blood pressure in Group A, 10 out of 20 patients (50%) required Nitroglycerine and 9 out of 20 patients (45 %) required Dexmeditomedine. And none of Group B patient required either of these two drugs. Average Nitrogycerine and Dexmeditomedine required in Group A is 7.5 mg and 50 µg respectively. Also average Isoflurane required in group A (1.195 %) was higher than average Isoflurane required in Group B (0.92 %). This difference was statistically significant (p-value 0.009).

Table 3 : Changes in diastolic blood pressure.

	Changes in diastolic blood pressure.		
Time (min)	**Group A**	**Group B**	**P value**
10min(baseline)	78± 8.8	78 ±8.6	0.5
20 min	74.5± 16.9	76.15 ± 10.26	0.35
30 min	66.4 ±11.33	70.45 ± 17.76	0.198
40 min	61.4 ±7.81	66.4 ± 11.84	0.062
50 min	93.85 ±9.986	94.35 ± 10.68	0.44
60 min	60.5 ±13.28	56.75± 8.849	0.151
70 min	56.9±6.889	57.75±11.85	0.392
80 min	54.6±7.236	56.95±10.04	0.201
90 min	57.9±7.41	54.2±6.38	0.05
100min	60±9.66	56.6±5.61	0.09
110 min	56.7±5.44	56±7.21	0.37
120 min	57.6±7.337	55.8±4.991	0.185
130 min	57.7±6.522	59.6±10.42	0.247
140 min	61.1±8.472	62.3±11.79	0.482
150 min	53.3±5.877	56±11.03	0.061

Baseline diastolic blood pressure was comparable in both groups. There was no significant difference (p-value > 0.05) in diastolic blood pressure of two groups throughout the procedure. [Table 3]

www.ijbamr.com P ISSN: 2250-284X , E ISSN : 2250-2858

Table 4 : Changes in heart rate.

	Changes in heart rate .		
Time (min)	**Group A**	**Group B**	**P value**
10min(baseline)	87.05 ±5.85325	87.4±6.1078	0.4271
20 min	84.7±15.5	85.4±16.1	**0.44**
30 min	80.2±11.22	81.75±14.92	0.356
40 min	76.3±9.54	78.2±11.1	**0.28**
50 min	73.7±8.4859	74.2±9.4846	**0.4307**
60 min	74.8±6.85	71.2±8.14	**0.07**
70 min	74 ±5.59135	69.85±8.57337	0.03949
80 min	72.05±5.1142	65.7±4.9215	0.0001
90 min	71.1±5.5715	67.25±7.1442	0.0327
100min	71.05±4.211201	66.4±6.524448	0.005762
110 min	70.15±3.31305	65.8±6.64593	0.00704
120 min	68.95±3.817894	64.2±5.809249	0.002218
130 min	68.45±2.645	63.35±6.699	0.002
140 min	69.75±2.93571	65.5±6.45067	0.00189
150 min	69.2±5.268	66±3.76	0.304

Baseline HR was comparable in both groups. There was no significant difference (p-value > 0.05) in heart rate of two groups till 60 min intraoperatively , however after 60 minutes heart rates in Group B were less than Group A which was statically significant (p-value <0.05) [Table 4] [Fig 1] Three out of 20 patients suffered from bradycardia in group B which was managed with inj Atropine 0.6 mg IV. This decrease in heart rate was probably due to use of intrathecal Clonidine in group B.[9,10]

www.ijbamr.com P ISSN: 2250-284X , E ISSN : 2250-2858

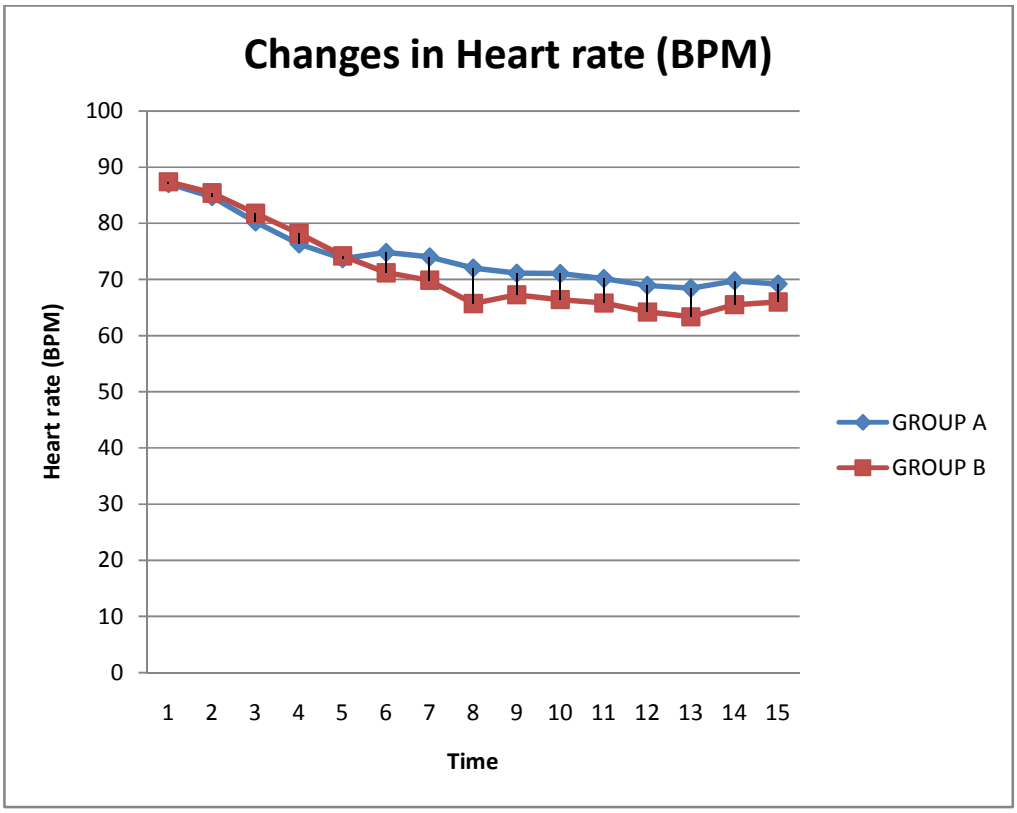


Fig 1 – graphical representation showing changes in average heart rates in two group.(1- Baseline , 2- pre induction , 3-15 – every 10 min intraoperatively)

Table 5 : Changes in mean arterial pressure.

	Changes in mean arterial pressure.		
Time (min)	**Group A**	**Group B**	**P value**
10min(baseline)	95±12	96±15	0.4
20 min	89.95±18.2	95±15.55	0.176
30 min	82.15±10.12	88±17.68	0.104
40 min	75.6±7.77	75.4±13.1	0.48
50 min	72.9±8.379	73.45±8.959	0.421
60 min	72.9±10.4	71.45±7.302	0.307
70 min	71.7±6.618	69.35±7.043	0.142
80 min	70.8±6.204	70.7±6.284	0.48
90 min	73±7.12	69.7±5.64	0.06
100min	70.9±7.3478	68.55±5.2863	0.1268
110 min	72.7±6.08	70.5±5.09	0.11
120 min	71.3±7.88	69.5±4.08	0.19
130 min	72.6±6.32	74.4±8.61	0.23
140 min	72.65±9.01037	74.4±11.1538	0.2583
150 min	73.1±9.63	68±10.3	0.49

www.ijbamr.com P ISSN: 2250-284X , E ISSN : 2250-2858

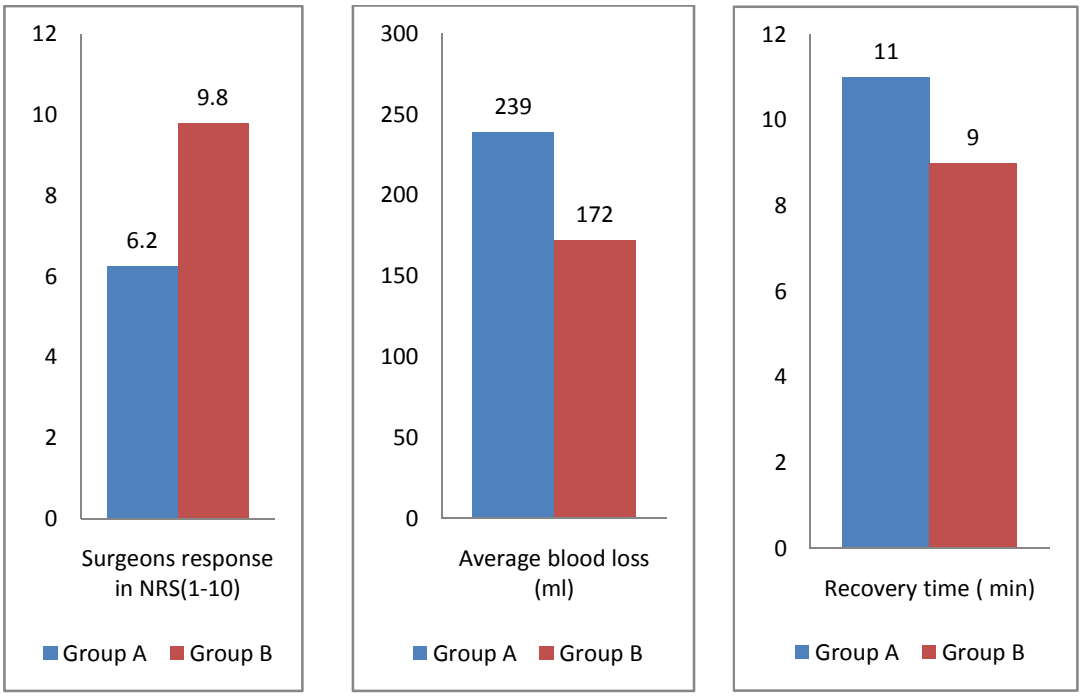
Baseline mean arterial pressures were comparable in both groups. There was no significant difference (p-value > 0.05) in mean arterial pressure of two groups. Intraoperatively there was no significant difference in MAP of two groups. However in Group A, 10 out of 20 patients (50%) required Nitro-glycerine and 9 out of 20 patients (45 %) required Dexmeditomedine. None of Group B patient required either of these two drugs. Average Nitrogycerine and Dexmeditomedine required in Group A is 7.5 mg and 50 µg respectively. Also average Isoflurane required in group A (1.195 %) was higher than average Isoflurane required Group B (0.92 %). This difference was statistically significant (p-value 0.009). [Table 5]

Table 6: Surgery and anesthesia characteristics

	GroupA (Mean±SD)	**GroupB (Mean±SD)**	**P-value**
Surgeons response in NRS(1-10)	6.25±2.24	9.8±0.36	0.00148
Average blood loss (ml)	239± 81.20	172± 32	0.001
Recovery time (min)	11.05± 2.06	9 ±2.22	0.002
Patients response to pain VAS(0-10)	6.01± 2.641	--	--

Surgeons were asked to grade the operative field on the basis of amount of bleeding inside the operative field. Surgeon's satisfaction was quantified by NRS from 1 to 10, with 1 meaning poor operative field and 10 meaning best operative field. In our study, we found that NRS in Group A was 6.25±2.24 and that for Group B was 9.8 ± 0.36 . This difference was statistically significant with P value <0.05. [Table 6] [Fig 2, A] The average recovery time (min), however, showed a significant variability in both the groups, with Group A requiring longer time (11.05 2.06) for extubation as compared to time required in Group B . This difference was statistically significant with P value < 0.05. (P = 0.002) [Table 6] [Fig 2, B] Also In our study, we found that average amount of blood loss (ml) is more in Group A (239±81.2) than the blood loss in patients of Group B (172± 32) which was statistically significant (p-value =0.001) [Table 6] [Fig 2, C] Patients response regarding post operative pain relief was recorded on the basis of VAS (Visual analogue scale). We found that average VAS in Group A was 6.01±2.64 and none of the patient in Group B complained of post operative pain. We observed that the post of pain relief in group B was 6-8 hours from the time of extubation. This was due to prolonged action of the additive intrathecal Clonidine in group B.

www.ijbamr.com P ISSN: 2250-284X , E ISSN : 2250-2858



Graph A **Graph B** **Graph C**

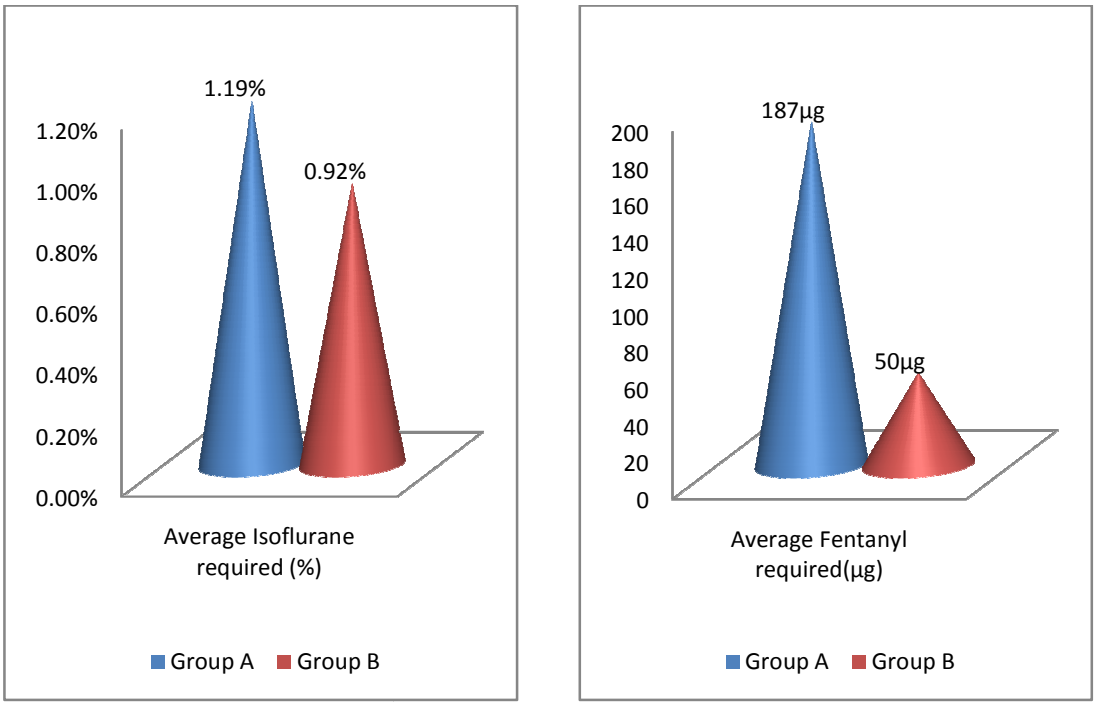
Fig - 2. Graphical representation of ; surgeons response in Numerical rating scale NRS (Graph A) , Average amount of blood loss in ml (Graph 2) , and recovery time in minute (Graph C) .

Table -7 : Average amount of Fentanyl , Isoflurane , Nitroglycerine (NTG) and Dexmeditomedine required intraoperatively.

	GroupA (Mean±SD)	**GroupB (Mean±SD)**	**P-value**
Average inspired Isoflurane required (volume%)	1.195 ± 0.3859	0.92 ± 0.3172	**0.0093**
Average Fentanyl required (µg)	187.80± 13.47	50.00	--
Average NTG required(mg)	7.5 ± 2.50	--	--
Average Dexmeditomedine required(µg)	50	--	--

Surgeons demand for hypotension intra-operatively in an order to get clear operative field with less blood loss. In our study to achieve hypotension during surgery above mentioned drugs were studied and compared in two study groups [Table 7]. It was observed that; Average amount of inspiratory Isoflurane required in group A (1.195 %) was higher than average Isoflurane required in Group B (0.92 %). This difference was statistically significant (p-value 0.009). [Table 7] [Fig-3 A].

Average requirement of Fentanyl during surgery was 187.80 µg for Group A and 50 µg for Group B. [Fig-3B]. However in Group A, 10 out of 20 patients (50%) required Nitroglycerine and 9 out of 20 patients (45 %) required Dexmeditomedine. None of Group B patient required either of these two drugs. Average Nitrogycerine and Dexmeditomedine required in Group A 7.5 mg and 50 µg respectively.



A **B**

Fig – 3 (A) Average Isoflurane required , (B) Average Fentanyl required intraoperatively.

DISCUSSION:

The spectrum of spinal surgery in adult life is considerable. Anaesthesia for major spinal surgery presents a number of challenges. Main concern for anaesthesiologist is to use safer anaesthesia technique for patient and give clear operative field to surgeon with minimum blood loss and postoperative pain relief. Although General anaesthesia is the preferred technique for all spine surgeries, both Spinal and Epidural anaesthesia have been successfully used for simple lumbar disc excision[12]. Studies suggest that spinal anaesthesia may be associated with a decreased blood loss, decreased early postoperative pain, lower incidence of nausea and vomiting, and a decreased incidence of deep vein thrombosis[13]. In this study we have combined spinal anaesthesia with general anaesthesia and compared with general

www.ijbamr.com P ISSN: 2250-284X , E ISSN : 2250-2858

anaesthesia alone. hypotensive anaesthesia may be used to improve the surgical field and to reduce blood loss during major spinal surgery. A number of Hypotensive agents have been studied during surgery to correct scoliosis. They include ganglion blocking agents, volatile agents,[14,15] calcium channel antagonists,[16] Sodium nitroprusside, Nitroglycerin,[17] and, in children, the dopamine-1 receptor agonist, Fenoldopam.[18] Mean arterial pressure (MAP) is typically maintained at 60 mm Hg. There is little evidence that any particular agent is superior, but the avoidance of tachycardia is an essential part of a good anaesthetic technique. Here in our study we have used Isoflurane , Nitroglycerine ,Dexmeditomedine for controlled hypotension and Fentanyl for pain relief. Properties of these agents are as given below;

Our study demonstrates that, by combining two techniques of anaesthesia SA and GA makes anaesthetic management of spine surgery easy. Requirement of spine surgery like hypotensive anaesthesia, intense intra and post operative pain relief ,intra and post operative patients comfort in prone position can be achieved by combining SA with GA. Using spinal anaesthesia with additive drug like Clonidine[9,10] gives good hypotensive anaesthesia without need of NTG,Sodium nitroprusside,Labetolol,Dexmeditomedine etc. Further , use of these hypotensive agents have their own disadvantages. [19] Combining two anaesthesia techniques to add their advantages and limit the side effects of each is not new. Luchetti et al., studied the combination of epidural and GA for laparoscopic cholecystectomy and inferred the combination to be safe and effective.[20] Poonam S. Ghodki et al, also concluded that combined spinal and general anaesthesia for laparoscopic hysterectomy.[8] Metabolic and neuroendocrine response is shown to be reduced by regional anaesthesia. [21,22] Spinal anaesthesia or epidural anaesthesia alone is being successfully utilised for single level microdissectomy , laminectomy.[6] But SA/EA alone in prone position makes patients very much uncomfortable. For major spinal surgeries like fusion, multilevel laminectomy still GA is technique of choice. But under GA, to provide the required hypotension needs higher concentration of inhalational agents, more analgesics and often the requirement of vasodilators like α_2 agonist, Nitroglycerine, Sodium nitroprusside, Labetolol etc. [2] When spinal anaesthesia is used in conjunction with general anaesthesia, the sympathectomy resulting from SA may give a sustained level of hypotension. Moreover the fluctuations in the blood pressure are not observed. It can be elucidated from our study that the requirement of Isoflurane was markedly reduced in combined SGA as compared to GA(p value < 0.05). This finding is in concordance with a study conducted by Poonam Ghodki et al. [8]. In our study we found that only minimum concentration of Isoflurane was required for maintenance of anaesthesia. This lower dose required in SGA group was for attenuation of pressor response to intubation only. The lower use of Isoflurane and opoid resulted in early awakening and extubation in group SGA as compared to group GA.As shown by significant difference in recovery time (p value < 0.05) By addition of 30µg Clonidine intrathecally along with hyperbaric Bupivacaine make the hypotensive anaesthesia easy to give. [9,10]Also it gives postoperative analgesia for 6-8 hrs. [9] The only disadvantage of adding Clonidine was that it causes decreased heart rate intraoperatively as observed in our study. The contribution of our study are comparison of two anaesthesia techniques, which to the horizon of our knowledge , has not been studied or reported for spine surgery. The appropriate utilization of anaesthetic agents,

www.ijbamr.com P ISSN: 2250-284X , E ISSN : 2250-2858

evaluation of haemodynamic parameters and studying recovery and complications.

LIMITATIONS

1. Our study was conducted on ASA-I and II class patients. So further studies on elderly and compromised cardiac function patients are required to recommend its use in such high risk patients. but the utility cannot be denied in high-risk , hypertensive or obese patients.
2. Immediate post operative neurological assessment is may not be possible in study group B patients due spinal anaesthesia involving nerve roots involved in assessment.

CONCLUSION

Our study demonstrates that combination of SA and GA technique provided better operative field, less blood loss and complete post operative pain relief compared to general anaesthesia alone. Further we observed that there was higher requirement of inhalational anaesthetic and various IV drugs to achieve hypotension and pain relief in patients with general anaesthesia alone compared to combined SA and GA. Besides excellent in getting clear operative field , less blood loss, and complete post operative pain relief multiple favourable additional effects on no unnecessary deepening of patient, and less incidences of postoperative sedation, PONV, shivering, etc. make combination of SA and GA technique more effective for use in lumbar spine surgeries. Based on our study we conclude that combination of SA and GA technique can be safely used for lumbar spine surgeries in ASA-I/II patients. But further studies are needed for confirming its safety in elderly patients and patients with compromised cardiovascular function.

REFERENCES:

1. Robert WA Nowicki, FRCA, Anaesthesia for major spinal surgery contn. Edu. Anaesthesia critic.care pain(2014) 14(4):147-2152
2. Khambatta HJ, Stone JG, Matteo RS et al (1978) Hypotensive anesthesia for spinal fusion with sodium nitroprusside. Spine 3:171
3. Leigh JM (1975) The history of controlled hypotension. Br J Anaesth 47: 745
4. Greenbarg PE,Brown MD, Pallares VS,Tompkins JS,Mann NH J.Epidural anaesthesia for lumbar spine surgery spinal disord. 1988;1(2):139-43
5. Mclain RF,Kalfas,Bell GR, Tetzlaff JE, Yoon HJ, Rana M, “Comparison of spinal and general anaesthesia in lumbar laminectomy surgery: a case controlled analysis of40patients.”J.neurosurg spine , 2005 Jan: 2(1):17-22
6. Mclain RF,Kalfas,Bell GR, Tetzlaff JE, Yoon HJ. complications associated with lumbar laminectomy : a comparision of spinal versus general anaesthesia.Spine (Phila Pa 1976) 2004 Nov. 15;29(22):2542-7
7. De Rojas JO, Syre P ,welchwc. Regional anaesthesia versus general anaesthesia for surgery on lumbar spine : a review of the modern literature Clinical neuro/neurosurg 2014 Apr119:39-43

8. Poonam S Ghodki , Shalini P Sardesai and Ramesh W. Naphade Combined spinal and general anaesthesia is better than general anaesthesia alone for laparoscopic Hysterectomy. Saudi journal of anaesthesia2014 Oct-Dec ;8(4) 498-503
9. Victor M Whizar-Lugo , Juan C. Flores – Carrillo , Susana Preciado –Ramirez Topics in spinal anaesthesia , chap 5. Intrathecal clonidine as spinal anaesthesia adjuvant-Is there marginal dose
10. Ranju Singh, Deepti Gupta & Aruna Jain The effect of addition of intrathical clonidine to hybaric bupivacaine on postoperative pain after lower segment caesarean section: RCT Saudi journal of anaesthesia 2013 Jul-Sept 7(3).283-290
11. Ronald D. Miller, Millers textbook of Anaesthesia 8th edi. P. 830 , box 30-1.
12. Jellish WS, Thalji W, Stevenson K, Shea J: A prospective randomized study comparing short and intermediate-term perioperative outcome variables after spinal or general anesthesia for lumbar disc or laminectomy surgery.Anesth Analg 83:559-564, 1996.
13. Jellish WS; Shea JF .spinal anesthesia for spinal surgery. Best Pract Res Clin Anaesthesiol Sep; 17(3):323-34. 2003
14. Beaussier M, Paugam C, Deriaz H, et al. Haemodynamic stability during moderate hypotensive anaesthesia for spinal surgery. A comparison between desflurane and isoflurane. Acta AnaesthesiolScand 1800; 44: 1154-9
15. Tobias JD. Sevoflurane for controlled hypotension during spinal surgery: preliminary experience in five adolescents. Paediatr Anaesth 1998; 8: 167-70
16. Hersey SL, O'Dell NE, Lowe S, et al. Nicardipine versus nitroprusside for controlled hypotension during spinal surgery in adolescents. Anesth Analg 1997; 84: 1239-44
17. Yaster M, Simmons RS, Tolo VT, et al. A comparison of nitroglycerin and nitroprusside for inducing hypotension in children: a double blind study. Anesthesiology 1986; 65: 175-9
18. Tobias JD. Fenoldopam for controlled hypotension during spinal fusion in children and adolescents. Paediatr Anaesth 2000; 9: 261-6
19. Mcdermott JP, Regan MC, Page R, Stokes MA, Kevin B, Moriarty DC, et al. Cardiorespiratory effects of laparoscopy with or without gas insufflation. Arch Surg. 1995;130:984–8. [PubMed]
20. Luchetti M, Palomba R, Sica G, Massa G, Tufano R. Effectiveness and safety of combined epidural and general anesthesia for laparoscopic cholecystectomy. Reg Anesth. 1996;21:465–9. [PubMed]
21. Rigg JR. Does regional block improve outcome after surgery? Anaesth Intensive Care. 1991;19:404–11. [PubMed]
22. Yokoyama M, Ohta Y, Hirakawa M, TSuge H. Hemodynamic changes during laparoscopic cholecystectomy under different anesthesia methods. Masui. 1996;45:160–6. [PubMed]