# COMPARATIVE STUDY OF HEMODYNAMIC STABILITY AND COST EFFECTIVENESS BETWEEN GENERAL AND SPINAL ANAESTHESIA IN PATIENTS AGE GROUP (0-5YEARS) IN LOWER ABDOMINAL AND LOWER EXTREMITIES SURGERIES

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## ABSTRACT

**BACKGROUND AND AIMS**
Aim of this study was to compare the changes in heart rate, blood pressure, oxygen saturation and cost effectiveness between general anaesthesia and spinal anaesthesia in pediatric patients undergoing lower abdominal and lower limb surgeries for the same duration.

**MATERIAL AND METHODS**
Fifty ASA1 patients in age group 0-5 years of either sex undergoing lower abdominal and lower limb surgeries were randomly divided in to two groups (Group-I GA group-n25 and Group-II SA group-n25). Group1 was given general anaesthesia and group-II was given spinal anaesthesia. Haemodynamic parameters and side effects during intra operative and immediate post-operative period were recorded and cost of GA and SA was calculated.

**RESULTS**
Patients in both the groups were comparable in surgical procedures and duration of surgery. Haemodynamically children in spinal group (Group-II) remained more stable intra operatively and no untoward incidence was observed in group-II. Spinal Anaesthesia was much more cost effective as compared to general anaesthesia.

**CONCLUSION**
Pediatric spinal anaesthesia is a safe and effective anaesthetic technique for lower abdominal and lower limb surgeries. It is much more cost effective as compared to general anaesthesia.

**KEYWORDS**
Spinal anaesthesia, General anaesthesia haemodynamic, Cost effectiveness.

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**INTRODUCTION:** During the first half of twentieth century spinal anaesthesia was commonly used for paediatric surgery,[1,2] because of various technical and ethical problems and improved general anaesthesia techniques the art and science of paediatric regional anaesthesia was neglected and it fell in to disuse.[3,4] However over the last, 2-3 decades there has been a renewed interest in regional anaesthesia for paediatric surgical procedures.[5,6] With simple guidelines for use, spinal anaesthesia is considered as a valuable, relatively safer and cost effective procedure for children undergoing lower abdominal and lower limb surgeries. Spinal anaesthesia is indeed a safer alternative to general anaesthesia for children with certain congenital anomalies, metabolic, neuromuscular, cardiac or chronic lung disease[7,8] spinal anaesthesia produces profound analgesia and good muscle relaxation with minimal physiological alteration[7] small children have little or no change in blood pressure and heart rare following spinal anaesthesia.[7,9]

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General anaesthesia exerts a potential adverse effect on post-operative course in infants through a variety of mechanisms.[10,11] Spinal anaesthesia decreases the risk of respiratory complications and need for post-operative ventilation and longer hospital stay resulting in to considerable cost saving without compromising quality of care.[12]

The study was undertaken to compare haemodynamic stability and cost effectiveness between general anaesthesia and spinal anaesthesia in children (0.5 years) undergoing lower abdominal and lower limb surgeries.

**AIMS AND OBJECTIVES:** To compare the changes in heart rate, BP, oxygen saturation and cost effectiveness in paediatric patients receiving SA and GA for lower abdominal and lower limb surgeries for the same duration of surgeries.

**MATERIAL AND METHODS:** This study was carried out at the department of Anaesthesiology and critical care, Geetanjali Medical College and Hospital, Udaipur (Rajasthan) during the period 2014-15 after approval of the hospital ethics committee and written informed consent from the parents/ guardians Fifty ASA-1 paediatric patients with age group 0-5 years of either sex undergoing lower abdominal and lower limb surgeries were included in this study. They were divided in to two groups on the basis of randomization.
**Group-1:** For surgery under general Anaesthesia.
**Group-2:** For surgery under spinal Anaesthesia.

**Exclusion Criteria:** Paediatric patients (0-5 years) excluded from the study were:

a) Patients with spinal deformities.
b) Patients with coagulation abnormalities and neurological abnormalities.
c) Any localized infection at the site of spinal block.

During the pre-anaesthetic visit, the plan of the study was explained to the parents and an informed written consent was obtained. Nil per oral status for four hours was ensured in all the patients. All cases were premedicated with Syp. diazepam 0.1mg/Kg 2 hours before surgery. After shifting the patients to operation table, monitoring of oxygen saturation, heart rate, non- invasive blood pressure was recorded as base line parameter. After sedation with Inj. ketamine 5mg/Kg IM, intravenous access was secured and I.V. fluid started. The patients were adequately hydrated to obviate any effect of unsatisfactory volume status on cardiovascular changes during the study. After premedication with Inj. Glycopyrrolate 0.01mg/kg, paediatric patients in group-1 were induced with inj. Propofol IV 2mg/kg body weight and endotracheal intubation was done with inj. succinyl Choline chloride 2 mg/Kg. I.V. Anaesthesia was maintained with sevoflurane 2-3% with oxygen (100%) Neuromuscular blockade was achieved with Inj. Atracurium 0.5 mg/Kg. Reversal of the neuromuscular blockade was achieved with Inj. Neostigmine 0.05 mg/kg and inj. Glycopyrrolate 0.01mg/ kg.

**Group-2 (SA group):** All patients in group 2 were premedicated with Inj. Glycopyrrolate 0.01 mg/kg with Inj. Ketamine 5 mg/Kg intra muscularly 15 minutes before surgery. Patients were positioned in right lateral position and after aseptic preparation of the back with betadine and spirit, subarachnoid puncture was done in L3-L4/ L4-L5 space by a 25 FG quincke's spinal needle. After obtaining free flow of CSF, Inj. Bupivacaine 0.5%, 0.5mg/ kg was injected. Care was taken not to place the feet higher than the head. The onset of level of sensory block was determined by attempting to elicit a grimace to bilateral pinprick at each dermatome. A block level of T-6 was taken to be appropriate for surgery on lower abdomen.

Every hospital has a different cost calculation for a procedure depending on the practices prevailing there. In our study we have tried to compare the cost effectiveness of two groups (GA versus SA for the same duration of surgery) we have taken the running cost which includes drugs, anaesthesia gas (oxygen) sevoflurane vapours, disposable items and IV fluids according to MRP a mentioned on the label. The cost of sevoflurane vapours and oxygen was calculated according to the average duration of surgery. In our institution the cost of sevoflurane with oxygen is charged at the rate of Rs700 per hour (2-3% sevoflurane with oxygen 4 litres per minute)

**The parameters recorded were:**

1. Preoperative base line value of heart rate, systolic and diastolic blood pressure, oxygen saturation.
2. Intra operative changes in blood pressure, heart rate and oxygen saturation every 5 minutes for the duration of surgery.
3. Time of onset and duration of sensory and motor block in group – II (SA group).
4. Duration of Surgery.
5. Any side effect/untoward incidence like vomiting, hypotension, desaturation or apnoea.
6. Post-operative changes in heart rate, blood pressure and oxygen saturation every 5 minutes for 30minutes and then every 15 minutes till 2 hours.
7. Cost of general anaesthesia and spinal anaesthesia. (Table I)

**Statistical Analyses:** The data was analysed applying the student's t-test Chi square test and analysis of variance (ANOVA) where applicable data was expressed as mean± standard deviation and P<0.05 was considered to be significant.

**OBSERVATIONS & RESULTS:** Fifty ASA-1 children (0-5 years) undergoing lower abdominal and lower limb surgeries were included in this study. They were randomly divided into 2 groups.

Group 1 (n=25) - These patients underwent surgeries under general anaesthesia.

Group 11 (n=25) These Patients underwent surgeries under spinal anaesthesia.

**Demographic Characteristics:** The mean age of the patients in group-1 ws 3.05±1.5 years and in group 11 was 3.23±1.31 years. There were 21 males and 4 females in group 1 and 20 males and 5 female children in group 11. The mean weight of the patients in group I was 12.60±2.80 Kg and in group11 was 13.10±3.46 Kg respectively. Patients in both groups were comparable in age (P value -0.660) and weight (p value – 0.577) and were statistically non-significant. (Table II)

**Base line parameters:** The base line parameters which included preoperative values of heart rate, systolic and diastolic blood pressure and oxygen saturation at room air were compared in both the groups. These were comparable in both the groups and were statistically non-significant (Table III).

Patients in both the groups were comparable in surgical procedure and duration of surgery. Majority of the patients in both the groups underwent herniotomy 12(48%) in group I and 10(40%) in group II. The mean duration of surgery was 35.6±13.56 min. in group I and 35.4±12.90 min. in group II these parameters were statistically (P value -0.958) non-significant.

**Intra Operative Changes:** The Mean preoperative base line values of heart rate were 99.36±6.07 bpm in group I and 100.80±7.96 bpm in group II. In group I there was increase in heart rate at 30-45 minutes from base line value. It increased by 5% at 30 min. (104.47 from 99.36) and 12% (111.11 from 99.36) at forty five minutes interval. During intra operative period no such increase in heart rate was observed in group II. The increase in heart rate was significant (p value 0.0008) at 30 minutes and (p value 0.0000) at 45 minutes in group I. (Table IV, V, VI and Fig. I & II).

The mean base line values of systolic blood pressure in groups I and II were 99.12±3.11 mm hg and 99.76±3.43 mm hg respectively. The mean base line values of diastolic blood pressure in group I and II were 48.64±2.29 mm hg and 50.00±2.52 mm hg respectively. intra operatively statistically significant increase in systolic as well as diastolic blood pressure was observed in group I at 30 and 45 minutes (p values 0.0000)(table V). there was little (1.24%) but significant (P value 0.0000) decrease in diastolic blood pressure from the base line value noticed in group II in first 15 minutes during intra operative period. There was no such decrease in group I. The oxygen saturation remained unchanged intraoperatively from the preoperative base line in both the groups.

**Post-operative Changes:** In group I in the initial twenty minutes interval the heart rate increased maximally by 18% at 1 minute and 10% at 20 minutes compared to the base line values, significant difference in heart rate was observed between the two groups in first 15 minutes (table VIII).

There was statistically significant difference in both the systolic blood pressure (p value 0.0007) and diastolic blood pressure (p value 0.0005) between the two groups at 15 minutes.

The mean oxygen saturation remained unchanged in both the groups when compared with base line values throughout the post-operative period. (Table VIII, IX, fig. III and IV)

**Intra post-operative untoward incidences/side effects:** In group I, two children had vomiting post operatively (incidence 8%), two children had brief apnoea in the immediate post-operative period (8%) and three children had desaturation ($spo_2$ <90% for more than 10 seconds) in the immediate post-operative period which was corrected by $o_2$ inhalation by face mark (incidence 12%) No untoward incidence was noticed in group II intra operatively or post operatively.

**Cost of Anaesthesia:** In our study, we have tried to compare the cost effectiveness of two groups (GA versus SA for the same duration of surgery) we have taken the running costs which include drugs, anaesthetic gases, vapour's, intra-venous fluids and disposable items etc. in to consideration. The overhead and fixed cost of anaesthesia were not taken in to consideration as they were common to both the groups. The cost of drugs were calculated according to the MRP (maximum retail price) as mentioned on the label. The cost of sevoflurane vapour and oxygen was calculated as per the rate fixed by the management (Rs. 700 per hour for GA).

The running cost of general anaesthesia for about one hour was Rs.1654.40 while the spinal anaesthesia was Rs 517.90 for the similar duration. It proves the point that spinal anaesthesia in children is much more cost effective and relatively safer technique as compared to general anaesthesia in lower abdominal and lower limb surgical procedures. (Table 1)

**DISCUSSION:** Although many studies have been done on spinal anaesthesia in children, there are few studies comparing spinal anaesthesia with general anaesthesia in such age group (0-5 years).[5,7,9,13] The majority of the studies to date are on infants with simple description of post-operative respiratory complication. In our study, an extensive comparison of cardiorespiratory changes and cost effectiveness were made between the two anaesthetic techniques in children (0-5 years).

The children in our study were continuously monitored to detect any alteration in the cardiovascular status following spinal and general anaesthesia. Children who received spinal anaesthesia did not experience any significant changes in heart rate in the intra operative period, heart rate remained close to the preoperative base line value during the surgery. in a similar study conducted by Dohi et al in 1979, no change in heart rate was observed in children below 8 years of age under spinal anaesthesia. [II] Increase in heart rate was seen in our study in the late intraoperative period in infants belonging to general anaesthesia group (table IV).

No significant change in the systolic BP was seen in the infants in the SA group in the entire intraoperative period which corroborate the findings of previous studies.[8,14] In our study, we observed a little but statistically significant (p value 0.0000) decrease in the diastolic blood pressure (1.24% from the base line value) in the initial 15 minutes intraoperatively in the spinal anaesthesia group. This was in contrast to the earlier studies[14,15] In our study the children in the SA group maintained oxygen satiation better than that of children in GA group both intraoperatively and postoperatively. Three children in GA group had slight fall in oxygen saturation in the immediate post-operative period but none in SA group had such problem.

We encountered few side effects in the GA group which included post-operative vomiting (8%) oxygen desaturation (12%) and apnoea (8%) after extubation which was corrected by oxygen inhalation by face mask. None of the children in SA group had such problem. The result of our study with regard to post-operative complication/side effects are in broad agreement with the results of previous studies.[7,13]

**CONCLUSION:** The purpose of this study was to evaluate and compose the effects of spinal and general anaesthesia on the cardiovascular status and arterial oxygen saturation of children aged 0-5 years. In addition a comparison of cost effectiveness of spinal versus general anaesthesia in lower abdominal and lower limb surgeries of same duration was also evaluated.

Fifty children in ASA 1 status posted for elective lower limb and lower abdominal surgery were divided randomly in to two groups. Children in group I (GA) underwent surgery under general anaesthesia whereas in group II (SA), spinal anaesthesia was administered.

Both the groups were comparable with respect to age, sex, weight and preoperative values of heart rate, blood pressure, $o_2$ saturation and duration of surgery but had significant difference in the cost effectiveness between two groups. General anaesthesia was almost three times costlier than the spinal anaesthesia.

In this study, cardiovascular and respiratory parameters were seen to be better maintained specially in post-operative period in the children belonging to spinal anaesthesia group, Post-operative period remained uneventful. The onset and duration of spinal block in children were found to be shorter when compared to adults.

It is concluded that spinal anaesthesia has a reasonable advantage over general anaesthesia, especially in immediate post-operative period and very cost effective. Longer period of analgesia, better haemodynamic stability, and costing less than on third of general anaesthesia make spinal anaesthesia an ideal method for anaesthetising children under going lower limb and lower abdominal surgeries of about one hour duration.

**TABLE-1 COST OF ANAESTHETIC DRUGS/ DISPOSABLES**

| DRUGS/DISPOSABLES | COST PER UNIT (Rs.) |
|---|---|
| **General Anaesthesia** | |
| INJ. GLYCOPYROLATE | 19.40 |
| INJ. PROPOFOL | 30.00 |
| INJ. SCOLINE | 7.00 |
| Inj. Atracurium | 126.00 |
| INJ. (REVERSAL) (Neostigmine + glycopyrolate) | 65.00 |
| Inj. Ketamine | 120.00 |
| I.V. SET. | 156.00 |
| Intra cath | 180.00 |
| ENDTRACHIAL TUBE | 222.00 each |
| Sevoflurane + Oxygen | 700/hour |
| DNS | 29.00 |
| **TOTAL** | **1654.40** |
| **Spinal Anaesthesia** | |
| INJ. BUPIVACAINE HEAVY | 25.00 |
| SPINAL NEEDLE (Size 25/27) | 125.00 |
| Intra cath | 180.00 |
| Syringe DISPO VAN 2 ml.+ 5 ml. | 18.50 |
| Inj. Ketamine | 120.00 |
| DNS one bottle | 29.00 |
| INJ. GLYCOPYROLATE | 19.40 |
| **TOTAL** | **517.90** |

**TABLE-2 DEMOGRAPHIC DISTRIBUTION**

| Age | Group 1(GA n=25) | Group 11 (SA= n=25) |
|---|---|---|
| 0-1 | 3 | 4 |
| 1-2 | 3 | 5 |
| 2-3 | 4 | 5 |
| 3-4 | 9 | 4 |
| 4-5 | 6 | 7 |
| Mean | 3.05± 1.52 | 3.23 ± 1.31 |
| **Sex** | | |
| male | 21 (84%) | 20 (80%) |
| Female | 4 (16%) | 5 (20%) |
| **Weight** | | |
| 6-10 kg | 7 | 7 |
| 11-15 | 13 | 15 |
| 16-20 | 4 | 3 |
| 7-20 | 1 | 0 |
| Mean ± SD | 12.60± 2.80 | 13.10 ± 3.46 |

**Table: 3 Baseline parameters**

| Parameter | Gp I (GA) (n = 25) | Gp II (SA) (n = 25) | T value | p-value |
|---|---|---|---|---|
| Heart rate (bpm) | 99.36 ± 6.075 | 100.80 ± 7.958 | 0.719 | 0.476 |
| SBP (mm Hg) | 99.12 ± 3.113 | 99.76 ± 3.431 | 0.691 | 0.493 |
| DBP (mm Hg) | 48.64 ± 2.289 | 50.00 ± 2.517 | 1.999 | 0.051 |
| $SpO_2$ (%) | 98.76 ±0.597 | 98.68 ± 0.627 | 0.462 | 0.646 |

**Table: 4 Type of surgical procedures and duration of surgery**

| Surgical procedure | Gp I (GA) n = 25 | Gp II (SA) n = 25 |
|---|---|---|
| Herniotomy | 12 | 10 |
| Circumcision | 1 | 3 |
| Urethroplasty | 4 | 4 |
| Orchiopexy | 1 | 2 |
| Orthopedics procedure | 4 | 3 |
| Plastic surgery procedures | 3 | 3 |
| Duration of surgery (min.) | 35.6 ± 13.56 | 35.4 ± 12.90 |

Duration of surgery (Gp. I and Gp. II) :- T value is 0.053 and p value is 0.958 (Non significant).

**Table: 5 Intra-operative Heart rate changes from baseline**

| Time (min.) | Group I (GA) | p-value | Group II (SA) | p-value |
|---|---|---|---|---|
| 01 | - 1.1200 ± 3.1134 | 0.0846 | - 1.080 ± 2.2531 | 0.0246 |
| 05 | - 0.8400 ± 3.5080 | 0.2430 | - 1.360 ± 2.4979 | 0.0118 |
| 10 | - 0.5600 ± 0.5833 | 0.4424 | - 0.4800 ± 2.6633 | 0.3765 |
| 15 | - 1.1200 ± 3.4195 | 0.1144 | - 0.9600 ± 2.6057 | 0.0779 |
| 20 | -1.4167 ± 3.0348 | 0.0317 | - 0.9200 ± 2.5482 | 0.0836 |
| 25 | - 1.7391 ± 3.2643 | 0.0180 | - 1.000 ± 2.6076 | 0.0942 |
| 30 | - 4.2353 ± 4.2357 | 0.0008 | - 1.750 ± 2.6204 | 0.0174 |
| 45 | - 13.330 ± 4.6904 | 0.0000 | - 1.400 ± 3.1340 | 0.1912 |
| 60 | - 3.500 ± 2.5166 | 0.0688 | - 1.3333 ± 4.1633 | 0.6347 |

**Fig: 1 INTRAOPERATIVE CHANGES IN HEART RATE BETWEEN TWO GROUPS**

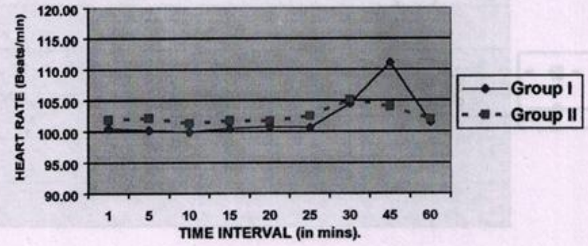

Table: 6 Intra-operative Blood pressure changes from the base line values

| Time (min.) | Group | SBP (mm Hg) | p-value | DBP (mm Hg) | p-value |
|---|---|---|---|---|---|
| 01 | Gp. I | - 0.1200 ± 1.5362 | 0.6992 | 0.0800 ± 2.1587 | 0.8548 |
| | Gp.II | 0.5600 ± 1.5832 | 0.0896 | 1.4400 ± 1.2275 | 0.0000 |
| 05 | Gp. I | - 0.0400 ± 1.7195 | 0.9086 | - 0.4000 ± 2.5495 | 0.4407 |
| | Gp.II | 0.7600 ± 1.3928 | 0.0117 | 1.1200 ± 1.1662 | 0.0000 |
| 10 | Gp. I | - 0.0400 ± 1.9468 | 0.9188 | - 0.0800 ± 1.8690 | 0.8323 |
| | Gp.II | 1.2000 ± 2.4495 | 0.0220 | 1.2000 ± 1.7320 | 0.0020 |
| 15 | Gp. I | 0.0000 ± 2.0412 | 1.0000 | - 0.7200 ± 2.1893 | 0.1132 |
| | Gp.II | 1.2000 ± 2.3094 | 0.0158 | 0.9600 ± 1.1719 | 0.0004 |
| 20 | Gp. I | 0.0435 ± 2.1842 | 0.9251 | - 0.4783 ± 1.8554 | 0.2295 |
| | Gp.II | 1.0800 ± 2.1779 | 0.0206 | 0.1200 ± 1.0132 | 0.5594 |
| 25 | Gp. I | 0.0455 ± 1.8120 | 0.9071 | - 0.6818 ± 2.2548 | 0.1708 |
| | Gp.II | 0.7273 ± 2.1198 | 0.1226 | 0.7273 ± 1.1622 | 0.0079 |
| 30 | Gp. I | - 5.6471 ± 1.9981 | 0.0000 | - 4.1176 ± 0.8575 | 0.0000 |
| | Gp.II | 0.7500 ± 2.1756 | 0.1881 | 0.7500 ± 1.4376 | 0.0543 |
| 45 | Gp. I | - 8.0000 ± 1.7320 | 0.0000 | - 5.5556 ± 1.3333 | 0.0000 |
| | Gp.II | 0.5555 ± 1.1304 | 0.1772 | 1.0000 ± 1.9436 | 0.1382 |
| 60 | Gp. I | 0.0435 ± 2.0512 | 1.0000 | - 2.0000 ± 2.0000 | 0.2254 |
| | Gp.II | 0.0000 ± 2.0000 | 1.0000 | 0.6666 ± 2.3094 | 0.6667 |

Fig: 2 INTRAOPERATIVE CHANGES IN BLOOD PRESSURE BETWEEN TWO GROUPS

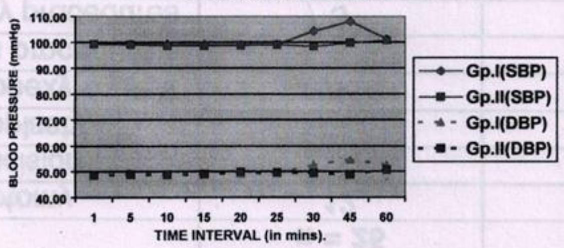


Table: 7 Intra-operative Oxygen saturation changes from the base line values

| Time (min.) | $SpO_2$ (%) Group I | p-value | $SpO_2$ (%) Group II | p-value |
|---|---|---|---|---|
| 01 | - 0.4400 ± 0.8205 | 0.0130 | - 0.0400 ± 0.8406 | 0.8139 |
| 05 | - 0.1200 ± 0.7810 | 0.4499 | - 0.3600 ± 0.8602 | 0.0472 |
| 10 | - 0.0400 ± 0.9345 | 0.8323 | - 0.4400 ± 1.0440 | 0.0457 |
| 15 | 0.0000 ± 0.7071 | 1.0000 | - 0.4400 ± 0.9609 | 0.0311 |
| 20 | 0.1739 ± 0.5762 | 0.1620 | - 0.3200 ± 0.9451 | 0.1034 |
| 25 | 0.0000 ± 0.7559 | 1.0000 | 0.2381 ± 0.9952 | 0.2861 |
| 30 | - 0.3529 ± 0.7859 | 0.0825 | - 0.2500 ± 0.8563 | 0.2610 |
| 45 | - 0.3333 ± 0.7071 | 0.1951 | - 0.4000 ± 0.9661 | 0.2229 |
| 60 | - 1.0000 ± 0.8165 | 0.0917 | - 0.3333 ± 0.5773 | 0.4226 |

Table: 8 Intra-operative changes in oxygen saturation between the two groups

| Time (min.) | $SpO_2$ (%) Group I | $SpO_2$ (%) Group II | p-value |
|---|---|---|---|
| 01 | 99.20 ± 0.65 | 98.72 ± 0.54 | 0.0065 |
| 05 | 99.88 ± 0.44 | 99.04 ± 0.45 | 0.2119 |
| 10 | 98.80 ± 0.65 | 99.12 ± 0.60 | 0.0756 |
| 15 | 98.76 ± 0.72 | 99.12 ± 0.66 | 0.0733 |
| 20 | 98.57 ± 0.51 | 99.00 ± 0.58 | 0.0082 |
| 25 | 98.73 ± 0.77 | 98.86 ± 0.65 | 0.5544 |
| 30 | 99.00 ± 0.50 | 98.88 ± 0.50 | 0.4781 |
| 45 | 98.89 ± 0.60 | 99.20 ± 0.42 | 0.2049 |
| 60 | 99.25 ± 0.50 | 99.00 ± 0.00 | 0.4367 |

Table: 9 Post-operative heart rate changes between two groups

| Time (min.) | Group I (GA) | Group II (SA) | p-value |
|---|---|---|---|
| 01 | 117.28 ± 8.05 | 102.64 ± 6.70 | 0.0000 |
| 05 | 111.16 ± 8.26 | 102.80 ± 6.93 | 0.0003 |
| 10 | 115.16 ± 9.03 | 102.56 ± 6.87 | 0.0000 |
| 15 | 113.44 ± 5.38 | 103.04 ± 7.39 | 0.0000 |
| 20 | 110.44 ± 6.38 | 103.12 ± 7.16 | 0.0003 |
| 25 | 103.04 ± 6.88 | 102.64 ± 7.27 | 0.8423 |
| 30 | 103.84 ± 4.43 | 103.68 ± 6.97 | 0.9231 |
| 45 | 102.88 ± 7.44 | 108.16 ± 9.68 | 0.0355 |
| 60 | 104.56 ± 5.08 | 105.60 ± 8.18 | 0.5917 |
| 75 | 100.80 ± 4.47 | 104.72 ± 7.11 | 0.0239 |
| 90 | 99.76 ± 5.17 | 102.08 ± 4.38 | 0.0933 |
| 105 | 100.80 ± 4.58 | 103.28 ± 5.77 | 0.0988 |
| 120 | 100.72 ± 4.95 | 102.88 ± 5.95 | 0.1674 |

Fig: 3 POSTOPERATIVE CHANGES IN HEART RATE BETWEEN TWO GROUPS

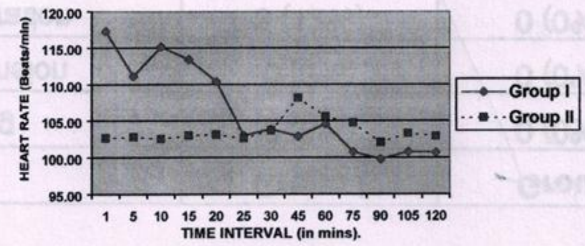


Fig: 4 POSTOPERATIVE CHANGES IN BLOOD PRESSURE BETWEEN TWO GROUPS

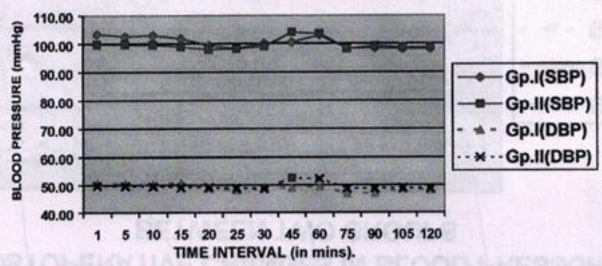


Table: 10 Intra and Post operative complications / side effects

| Event | Group I | Group II |
|---|---|---|
| Vomiting | 2 (8%) | 0 (0%) |
| Hypotension | 0 (0%) | 0 (0%) |
| Desaturation | 3 (12%) | 0 (0%) |
| Apnea | 2 (8%) | 0 (0%) |
| **Total** | **7 (28%)** | **0 (0%)** |

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