RETROSPECTIVE ANALYSIS OF SPINAL ANESTHESIA FOR DAYCARE SURGERY DURING THE COVID-19 PANDEMIC.

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ABSTRACT

Introduction

We preferred general anesthesia over spinal anesthesia for day care surgeries in our center. During COVID-19 pandemic, we planned subarachnoid blocks for daycare surgeries, to minimize aerosol generation and to reduce virus transmission risk to health care professions.

Objectives

This study intended to compare time of discharge after subarachnoid block with general anesthesia in day care surgeries. We compare time to achieve post-anesthetic discharge score (PADS) equal to or more than nine; need for overnight hospitalization; and complications.

Methodology

A retrospective analysis of cases posted for elective daycare surgery in our institute during COVID-19 pandemic from May 2020 to November 2020 were identified. We compared time to discharge home inpatients who received general anesthesia and spinal anesthesia. Normality of distribution was determined using Two sample Kolmogorov-Smirnov Tes. Student t test was used for normally distributed data, Mann-Whitney U test was used for non-normal distributed data. Categorical variables were analyzed using a chi-squared or Fisher's exact test.

Result

A total of 2214 patients were included in this study.181 patients remained for analysis; 70 in the general anesthesia group and 91 in the spinal anesthesia group. Mean time (±SD) to achieve PADS score in group GA is 263.47(±75.06) whereas in group SAB was 339.55(±156.903). Mean time (±SD) taken to discharge home in group GA was 296.08 (±74.76) whereas in group SAB was 365.66(±158.68) minutes respectively. Post hoc power of the study was 95.8.

Conclusion

With low dose bupivacaine, spinal anesthesia is a safe alternative for ambulatory day care surgeries.

KEYWORDS

ambulatory care, daycare surgery, pain management, post-dural puncture headache, regional anesthesia, spinal anaesthesia

INTRODUCTION

The years after 2020 have been challenging for all health care professionals due to the COVID-19 pandemic. Anaesthesiologist are at higher risk of exposure to COVID virus because airway interventions, like a bag and mask ventilation, use of supraglottic airway devices, intubation and extubation of trachea generate aerosol. The Odds of transmission of acute respiratory infection during tracheal intubation to a healthcare professional is 6.6 times higher than those not exposed to tracheal intubation.[1] Avoiding airway manipulations and aerosol generating procedures may reduce the risk of COVID-19 transmission to healthcare workers.[2]

When patient is discharged from the hospital on the same day after any surgical procedures is known as daycare surgery. Post Anesthesia Discharge scoring System (PADSS) is a well-accepted tool used to discharge patients who are posted for daycare surgery.[3] The potential benefits of daycare surgeries for the patients are more personalized care, high satisfaction, and recovery in a home environment, similarly, the benefits for the hospitals are high turnover, running cost reduction, fewer requirements of manpower, etc.[4]

The daycare surgeries are performed under sedation or general anesthesia. Recovery of the motor blockade after use of bupivacaine in spinal anesthesia takes a longer duration. Spinal anesthesia prolongs time to achieve PADSS. Before the COVID-19 pandemic, we preferred general anesthesia to spinal anesthesia for daycare surgeries in our center. During the COVID-19 pandemic started, we started offering spinal anesthesia wherever spinal anesthesia would be applicable, to our patients as an option over general anesthesia for daycare procedures.[3,4,6] We intended to compare time taken to discharge patient after a subarachnoid block with general anesthesia in daycare surgery patients in this review. We also planned to compare time to achieve a score equal to or more than nine using PADSS, the need for overnight hospitalization, and complications between spinal and general anesthesia.

METHODOLOGY

Patients

After IRC clearance (ref number: IRC-RP-2077/004), all cases posted for elective daycare surgery in our institute from the start of COVID-19 pandemic from May 2020 to November 2020 were included in this study.

Exclusion criteria

Surgery done under local anesthesia, MAC, Peripheral nerve block, and any admitted cases due to surgical complication, ASA-PS IV and V were excluded from this study.

Anesthetic Technique

All the patients who were posted for daycare surgery were given the choice of anesthesia either of general anesthesia or spinal anesthesia was given. Risks and benefits of either technique and the risk associated COVID-19 were well explained. Patients and their relatives decided the mode of anesthesia.

Patients were requested to have nil per oral of 6 hours for solid food and 2 hours for clear liquid and it was confirmed on day of surgery. No premedications were allowed, except for chronic medications. An intravenous line with 18G or 20G needle was secured and the ringer's lactate solution was started. ECG and oxygen saturation (SPO2) was monitored continuously and automated noninvasive blood pressure was measured every 5 minutes throughout the surgery in all the cases. Standard techniques of subarachnoid block or general anesthesia were administered according to institutional protocol.

Spinal anesthesia was administered with the patient in either lateral decubitus or sitting position at L2-3 or L3-4 interspace after infiltration with local anesthetic. A 27-gauge spinal needle (Whitacre) was used and hyperbaric bupivacaine 5-10 mg was injected after free flow of CSF. If there were difficulties performing subarachnoid block with a 27 gauze needle, anesthesiologists used a 25 gauze Quincke needle. If supplemental general anesthesia was required due to complete or partial failure of spinal anesthesia, the patients were analyzed as the general anesthesia group.

General anesthesia was induced with propofol 1.5 mg/kg and fentanyl.[1] microgram/kg. The supplement oxygen was given via simple face mask. If oxygenation was adequate with the facemask, the airways was secured with I-gel (intersurgical[R]). If anesthesiologists preferred endotracheal intubation, then vecuronium 0.1mg/kg was given and reversal of neuromuscular blockade was done with neostigmine and glycopyrrolate in such cases.

All the patients received 1mg injection granisetron at the end of surgery. Patients were then transferred to the post-anesthesia care unit, where vitals (pulse rate, blood pressure, SPO2 and respiratory rate) were monitored as per institute standard protocol and charted in the modified early warning system (MEWS) chart. In addition to MEWS, PADSS and Aldrete's scores were also monitored every 30 minutes till a score of 9 or more was achieved. If the PADSS more than 9 was not achieved within 24 hours, patients would be considered as admission. Patients were allowed out of bed mobilization as soon as the spinal block had regressed and the patients felt comfortable.

Evaluation of outcomes

The time to discharge, time to achieve score equal to or more than nine using PADSS; need for overnight hospitalization; and side effects and complications like hypotension, bradycardia /tachycardia, nausea, vomiting, urinary retention, fall, shivering, headache and backache were recorded from the charts and postoperative telephonic surveys.

Post-operative follow-up

Incidence of post-discharge headache and other associated complications were extracted from post-discharge telephone survey records.

Policy for missing and conflicting data:

If data on discharge times and score of PADSS swere unavailable, such cases were excluded from analysis. If data on more than 10% of the variables were unavailable, such

cases were also excluded from analysis. A conflicting data is defined as two or more different versions of the same event in the database. In case of conflicting data the first recorded data were accepted.

Statistical analysis:

The abstractor, who is not involved in the study, reviewed the medical data record and entered the data in the Excel chart according to inclusion criteria. Normality of distribution of data was determined using Two sample Kolmogorov-Smirnov Test and review of histograms. Student t test was used for normally distributed data whereas Mann-Whitney U test was used for non-normal distributed data (mean time to discharge and the mean time to achieve score of 9 PADSS. Categorical variables were analyzed using a chi-squared or Fisher's exact test. A p-value < 0.05 was considered statistically significant. Post-hoc power calculator clinical was used to determine the power of the study.[13]

RESULT

Out of two thousand two hundred and fourteen surgeries performed from May to November 2020, one hundred and eighty two cases were posted as daycare surgery. Among these, twenty cases met exclusion criteria and hence excluded from the analysis (Figure1). Those who met inclusion criteria, seventy-one cases were done under general anesthesia and ninety-one cases were performed under spinal anesthesia. One case where data could not be retrieved was excluded from the analysis. (Figure 1). There was not any conflicting data.

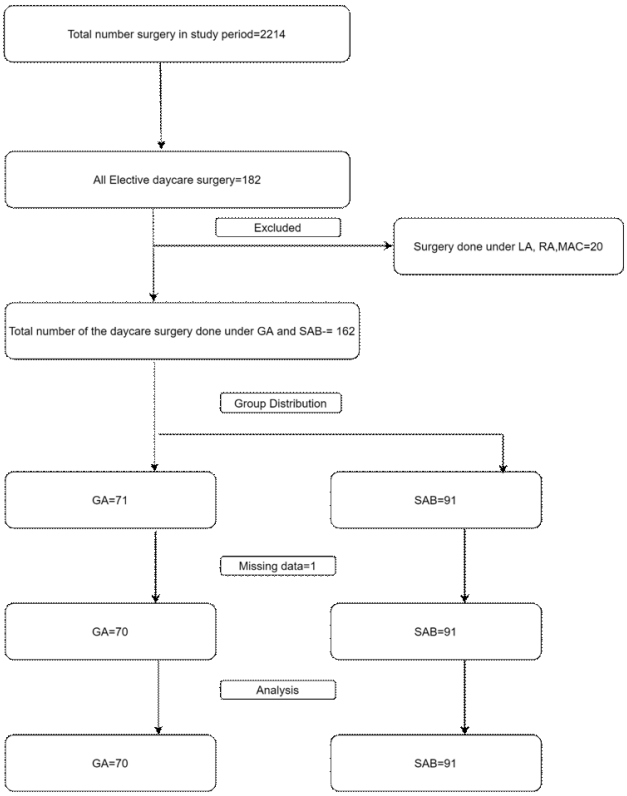

Figure 1: Consort flow diagram spinal vs general anesthesia for daycare surgery.

Demographic description and type of anesthesia delivered for daycare surgery are shown in Table 1.

Table 1: Comparison of Demographic distribution.

Variables	GA (n=70)	SAB(n=91)	P-value
Age*	36.91(±16.43)	43.03(±13.76)	0.0111
Weight* (kg)	63.18(±14.801)	66.07(±11.701)	0.1467
Sex(M/F)#	(18/52)	(28/63)	
ASA(I/II/III)#	(37/31/2)	(41/45/5)	

*Data are given in mean (±SD)

#Data is given in absolute numbers.

The mean time to achieve 9 score using PADSS for groups GA vs SAB was 263.47 minutes (i.e. four hour and twenty-four minutes) vs 339.55 minutes (i.e. five hours and thirty-nine minutes). Similarly, the mean time taken to discharge home and 296.08 minutes (four hours fifty-five minutes) vs 347.29 minutes (i.e. six hours and five minutes) respectively, and shown in Table 2.

Table 2: Comparison of time taken to achieve 9 score using PADSS and time taken to discharge.

Variables	GA	SAB	p-Value
Time taken to achieve PADS*	263.47(±75.06)	339.55(±156.903)	0.0002
Time taken to discharge home*	296.08(±74.76)	365.66(±158.68)	0.0008

*time expressed in minutes. PADSS: Post Anesthesia Discharge Scoring System

*Data are given in mean (±SD)

The post hoc power of the study was 95.8.

Complications were not recorded in both groups. Onepatients required admissions due to fall however no other significant complications associated spinal and general anesthesia were recorded during hospital stay.

The telephonic survey did not record any incidence of postdural puncture headache hypotension (PDPH), bradycardia /tachycardia, nausea, vomiting, urinary retention, fall, shivering, headache and backache within one month follow-up records of the patients.

DISCUSSION

In our study, we found that out of seventy cases done under general anesthesia (GA) and ninety-one cases performed under spinal anesthesia (SAB) the mean time to achieve 9 score using PADSS in group GA is four hours and twenty-four minutes (4 hours 24 mins) whereas in group SAB was five hours and thirty-nine minutes (5 hours 39 mins). Similarly, the mean time taken to discharge home in group GA was four hours fifty-five minutes whereas in group SAB was six hours and five minutes respectively. The post hoc power of the study was 95.8. Besides, one patient in group SAB needs hospital admission, no other complications are recorded during the perioperative period and forty-eight-hour and one-month telephonic follow-up. The mean time difference to achieve 9 score using PADSS and time to discharge was statistically significant but the difference between one hour and fifteen minutes and two hours and ten minutes

respectively are not practically significant. There were no significant complications during hospital stay and follow up after one month.

The dose of bupivacaine as low as 5-10 mg was sufficient to elicit the adequate anesthesia for different types of surgery like gynecological laparoscopic, lower limb surgeries.[8,9] In a study done by Gupta et al in 2011 where PADSS score after spinal anesthesia was noted and patients were discharged only when they achieved a total score of 9. Thirty-two 32 patients (62%) achieved discharge criteria within 4-8 hours while 28% of patients achieved discharge criteria within 8-12 hours.[10]The results were similar to our study where we used comparable dose of bupivacaine and achieved discharge criteria within 6-7 hours. Our study finding of 365.66 minutes in the SAB group was similar to the study done by Sirivanasandha B where the mean time to discharge was 309+/- 94 minutes where low dose bupivacaine was used for the TURP procedure.[11]The time required to achieve the PADS score after different doses of bupivacaine was out of scope of the study design.

A study by Kallio et al[12]showed that patients were fit for discharge after 6.0 hours (5.2-6.6hours) and were discharged after 6.6 hours (5.9-9.0 hours) after 10mg of plain ropivacaine with spinal anesthesia. In our study, the time duration for the discharge of patients from PACU was 296.08 minutes (4.93 hours) among the general anesthesia group whereas it was 365.66 minutes (6.09 hours) among the spinal group. In the SAB group, the time to discharge was almost similar to the study by Kallio, though they had used ropivacaine. The recovery time of motor blockade by ropivacaine after spinal anesthesia is faster than the same by bupivacaine. In our study, all patients did not received the same dose of bupivacaine as we had used the lowest possible dose. The duration of motor blockade by different doses of bupivacaine after spinal anesthesia for daycare surgery could not be analyzed in the present study.

British Association of Day Surgery suggested that spinal anesthesia is well accepted for use in day surgery with the introduction of low-dose local anesthetics and newer shorter-acting local anesthetics such as hyperbaric prilocaine 2% and 2-chloroprocaine.However, we use 0.5% heavy Bupivacaine less than 10 mg that we found very effective with minimal adverse effects.[6] In our study, we did not record any major complications. None of our patients required Foley catheterization or re-admission due to urinary retention. There were no incidence of postoperative nausea and vomiting, postoperative confusion. There was no incidence of PDPH in our study as telephonic follow-up was done 48 hours and one month following patient discharge.

There were many reasons for the lesser incidence of post-operative complications. First we used the lower dose of bupivacaine i.e. less 10 mg. The lower dose of bupivacaine attributed not only to the faster motor recovery but also to the minimal complications. Second we used small bore i.e. 27 gauze pencil-pointed spinal needles and third according to our intuitional protocol, we performed all spinal anesthesia in the lateral decubitus position using a twenty-seven gauge pencil point spinal needle. In case of difficulty with spinal anesthesia, we used a twenty-five gauge Quincke-type spinal needle but we maintained the decubitus position. The pencil point (Whitacre needle) twenty-seven gauge was used for spinal anesthesia which may be attributed to a lower incidence of PDPH.[13] Concerns regarding post-dural puncture headache have previously limited the use of spinal anesthesia in day surgery patients, but the use of smaller gauge (27 G) and pencil-point needles has reduced the incidence of PDPH to <1% as.[3,13] Furthermore, we performed spinal anesthesia in the lateral decubitus position which may have attributed lower incidence of PDPH. Though not the scope of the present study, the incidence of PDPH is lower if spinal anesthesia is performed in a lateral position.[13]

One patient in the group SAB group was admitted for a fall after mobilization which may be attributed to the finding of postural hypotension. Old age, low albumin level, prolonged duration of surgical time, incomplete recovery of motor power after spinal anesthesia, and residual effects of anesthetics are the causes of falls in the postoperative period. Interestingly, the most incidence of falls during post-anesthesia care occur in daytime, bedside, and wards but not in critical areas. It may be because patients and their caretakers became less cautious in these situations.[14] We used the PADSStool to mobilize the patient. Patients were mobilized only after the complete reversal of motor power.

CONCLUSION

With low-dose bupivacaine, spinal anesthesia is an effective for ambulatory daycare surgeries with early mobilization and no incidence of adverse events such as urinary retention, PDPH, and PONV. Thus during this pandemic of COVID-19, we foundspinal anesthesia performed with hyperbaric bupivacaine (5-10mg) is an safe alternative to GA.

RECOMMENDATIONS

We recommend spinal anesthesia could be used for daycare surgeries and the discharge scoring tools like PADSS should to be implied to discharge patients who are posted for daycare surgeries.

LIMITATION OF THE STUDY

As with other retrospective studies, selection bias is a limitation of our study. A relatively small sample size also is another limitation. If the study included preoperative and postoperative data on SARS-CoV-2 rT-PCR data and clinical symptoms, the study would have been more meaningful.

CONFLICT OF INTEREST

Authors have no conflict of interest and financial considerations

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FINANCIAL DISCLOSURE

None

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