

# Rapid Sequence Spinal Anesthesia Vs General Anesthesia for Category-I Urgency Caesarean Section

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## Abstract:

**Aims of study** - Rapid Sequence spinal anesthesia Vs general anesthesia for category-I urgency caesarean section. **Background** - Pregnancy termination by caesarean section (CS) is rapidly increasing all over the world. Hence, it has increasingly become a greater challenge to provide care for the parturient, but this has given obstetric anesthetists a greater opportunity to contribute to obstetric services. While caesarean deliveries were historically performed using general anaesthesia, there is a recent significant move towards regional anaesthesia. **Materials and Methods** - As per American Society of Anesthesiologists physical status (ASAPS) I 50 patients of category I were included in this study and divided into two equal groups, 25 in each group. Group I received GA and group II received RSSA. **Result** - Time for anesthesia was more in the RSGA group than the RSSA group, which was statistically significant ( $P < 0.001$ ). The time for surgical readiness was also significantly higher in the RSGA group in comparison to the RSSA group with  $P$  value of  $< 0.001$ , which was statistically significant but there was no significant difference in Incision to delivery time.

**Keywords** - CS, GA, SA, RSSA, RSGA, caesarean, ASAPS

## Introduction

Pregnancy termination by caesarean section (CS) is rapidly increasing all over the world (1). Hence, it has increasingly become a greater challenge to provide care for the parturient, but this has given obstetric anesthetists a greater opportunity to contribute to obstetric services. While caesarean deliveries were historically performed using general anaesthesia, there is a recent significant move towards regional anaesthesia. The National Confidential Enquiry used four point classification for urgency of CS.

- Category 1** - immediate threat to life of the woman or fetus,
- Category 2** - maternal or fetal compromise, not immediately life threatening,
- Category 3** - need early delivery but no maternal or fetal compromise,
- Category 4** - at a time to suit the woman and maternity team (2).

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General anaesthesia (GA) is the fastest method for anaesthetising a category-1 caesarean section than spinal anesthesia (SA) but is associated with increased maternal morbidity and mortality. Spinal anesthesia (SA) has become the standard technique in category 2, 3, and 4 as it results in less maternal and neonatal morbidity than general anesthesia (3). However, RSGA is currently being challenged due to risk of hypoxia, aspiration, and controversies regarding the technique practiced, choice, and doses of drugs (4). If SA can be performed faster, it will become a more acceptable option in category 1 CS. A specific approach of spinal anesthesia called rapid sequence spinal anesthesia (RSSA) for category 1 obstetric cases has been described (5). To successfully perform this technique, it is important to multi-disciplinarily discuss with all staffs related to delivery, make a local protocol in each hospital and simulate the procedure with them. Owing to the above preparation, we were able to perform the technique smoothly also in the real patient. Considering possible benefits of rapid sequence spinal anesthesia, we should prepare enough before we use it in the actual clinical situations.

General anesthesia may be a more appropriate choice in situations such as: Emergent (category I) delivery e.g., fetal bradycardia, uterine rupture, umbilical cord prolapsed. There are contraindications to neuraxial anesthesia such as coagulopathy or extensive spinal surgery e.g., severe hemorrhage, placenta abruption with evidence of coagulopathy. Neuraxial anesthesia fails and the patient

refuses neuraxial anesthesia. GA is often the most practical technique for emergent cesarean delivery.

## Materials and Methods

As per American Society of Anesthesiologists physical status (ASAPS) I 50 patients of category 1 were included in this study and divided into two equal groups, 25 in each group. Group I received GA and group II received RSSA. Experienced anesthesiologist performed either of the two techniques, and another person not involved in performing the procedures, recorded the Apgar scores and the following times: patient's arrival at operating room, start of anesthesia induction time, skin incision, baby delivery, completion of surgery, and shifting from OT to ward. The time intervals were defined as time for anesthesia from start of anesthesia to the completion of induction, time for surgical readiness, incision to delivery time and emergence time.

In GA (group I), patients were prepared and draped before the induction of anesthesia, and in RSSA (group II), patients were prepared and draped after the administration of block. To overcome the problem regarding time calculation, we considered the time for anesthesia from the start of anesthesia to completion of induction and time to achieve surgical readiness instead of the time for induction. After admission, intravenous (IV) cannulation was done and ringer lactate 10 ml/kg was started. Aspiration prophylaxis (Ranitidine 50 mg IV, Metoclopramide 10 mg IV) was administered. Continuous monitoring of vital parameters of the fetus and mother was done. As soon as the decision of CS was made, the anesthetic drug kit and difficult airway cart (either for GA or SA) was prepared and the anesthesiologist. This preoperative preparation part was similarly designed for group I and group II.

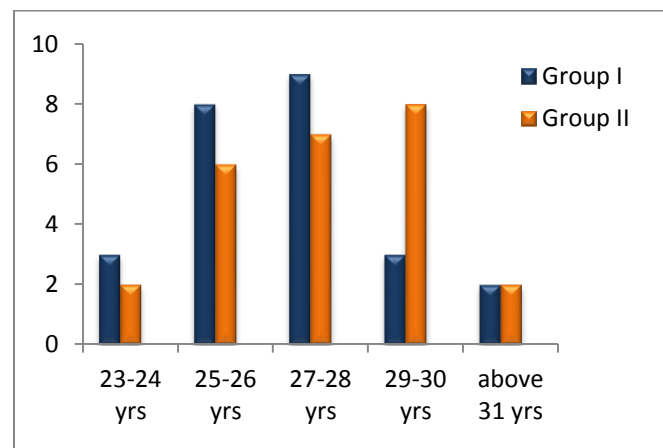
In group I, induction was done with thiopental 5.0 mg/kg over 10–15 s after denitrogenation with 4 vital capacity breaths. Intubation was performed with succinylcholine 1.0 mg/kg. The cricoid pressure was applied before patients lost consciousness, and it was continued until the correct position of the endotracheal tube was verified and the cuff was inflated. Left uterine displacement was performed by putting a wedge under the right buttock to prevent supine hypotension syndrome. Time intervals during the technique were calculated.

Group II was established with 26 G pencil point spinal needle in L3, L4 or one space below in a sitting position with 2.5 ml of hyperbaric bupivacaine (0.5%) without adjuvant after cleaning the skin with a single wipe of 0.5% chlorhexidine. Drug kit for SA was prepared aseptically, and the anesthesiologist who performed the procedure was ready with a sterile gown and gloves before the patients came to the operating room. The patient was placed in a Trendelenburg position with a head down tilt of 15° after the

procedure. Times for different components of RSSA were recorded similarly. After administering spinal anesthesia, draping was done, and simultaneously the progression of the level of block was assessed aseptically by loss of cold sensation. When block height was achieved up to T10, surgeons started the procedure. Intraoperative heart rate, noninvasive blood pressure, electrocardiogram, oxygen saturation, and end tracheal carbon dioxide concentration were monitored. Apgar score was noted at birth and 5 min after the delivery (6,7).

**Table no 1:- Shows Age wise distribution of Group I and Group II**

Age Group	Group I (n=25)	Group II (n=25)
23-24 yrs	3	2
25-26 yrs	8	6
27-28 yrs	9	7
29-30 yrs	3	8
Above 31	2	2



## Statistical analysis

Data were expressed as mean  $\pm$  SD. Student t-test was used to compare the difference between the two means; and Spearman test was used for the correlation. P-value less than 0.05 were regarded as significant. A statistical analysis was performed using the Statistical Package for the Social Science program (SPSS, 23.0). Frequencies and percentages were used for the categorical measures.

## Exclusion Criteria

Maternal coagulopathy,  
Hemodynamic instability  
Having anticipated difficult intubation was excluded from this study.

## Ethical committee Clearance

All studies on Human Volunteers were approved by the Institutional Ethics Committee of Chandulal Chandrakar Memorial Medical College Kachandur Durg (C.G).

## Observation, Result and Discussion

**Table 2 shows data and Apgar score of group I and group II patients.**

	Group I	Group II	'P' value
Age(Yrs)	27.93 ± 3.72	28.31 ± 2.74	0.583
Height (cm)	149.92 ± 5.83	151.06 ± 5.15	0.498
Weight (kg)	54.48 ± 4.73	53.19 ± 4.24	0.915
Apgar Score	6.82 ± 2.16	7.01 ± 2.21	0.401

The average age group of group I was 27.93 ± 3.72 and 28.31 ± 2.74 of group II there was no difference in age group. Height of group I was 149.92 ± 5.83 and 151.06 ± 5.15 of group II there was no significant difference in height. There was no significant difference found in weight (54.48 ± 4.73, 53.19 ± 4.24) and in Apgar score (6.82 ± 2.16, 7.01 ± 2.21) of both the groups.

**Table 3 Indications of category 1 cesarean section**

Indications	Group I (n=25)	Group II (n=25)
Major hemorrhage	16	4
Fetal bradycardia	5	18
Chord prolapse	1	1
Shoulder dystocia	1	1
Uterine rupture	2	1

The present study, indications of category 1 CS was major hemorrhage, profound and persistent fetal bradycardia, prolapsed cord, shoulder dystocia, and uterine rupture.

**Table 4 shows time interval in group I and group II**

	Group I	Group II
Time for anesthesia	145.38±3.92	130.98±4.02
Time for surgical readiness	180.93±5.98	167.37±2.94
Incision to delivery time	184.72± 7.93	181.90±8.49
Emergence time	498.43±37.67	230.65±17.83

Time for anesthesia was more in the RSGA group than the RSSA group, which was statistically significant ( $P < 0.001$ ). The time for surgical readiness was also significantly higher in the RSGA group in comparison to the RSSA group with  $P$  value of  $< 0.001$ , which was statistically significant shown in table no 4. Rapid sequence spinal anesthesia (RSSA) is a recently developed technique for the most urgent cesarean section, category-1 in the National Institute for Clinical Excellence (NICE) guideline, where general anesthesia has extensively been performed (8,9,10). In terms of safety of anesthesia, if we do not have to think about time constraints, spinal anesthesia is basically safer, and RSSA is designed to satisfy also the time constraints. Different from spinal anesthesia for elective cesarean section, RSS is

characterized by specific anesthetic procedure including the methods of sterilization, dose of anesthetics, and required level of spinal anesthesia before starting surgery for shortening the decision-delivery interval (8). However, it is important to note that successful RSSA requires effective deployment of medical staffs and teamwork, as suggested by Kinsella (8). We recently created a local protocol of RSS in our hospital after multi-disciplinarily discussion, and performed its simulation, which significantly contributed to perform RSS successfully for category-1 cesarean section.

After making a decision to introduce RSSA in our hospital, we initially informed obstetricians, pediatricians, nurses in the operating room, obstetric suite and neonatal intensive care unit of the details of RSS, and held repeated discussion to clarify the role of each staff to create a local protocol of RSS. This protocol includes the role of each staff for postural change and measuring vital signs, dose for spinal anesthesia, and T10 cold sense block to start surgery. Simulation of RSS by all the related staffs was also performed, which was beneficial for all members to understand the differences between RSS and spinal anesthesia for elective cesarean section and to recognize their roles in the practice of RSS.

Following creation of the protocol and simulation of RSS, we performed RSS in a parturient, who was admitted to our hospital at 36 weeks' gestation with a history of suprapubic pain. The fetal heart rate progressed to a persistent bradycardia and category-1 cesarean section was determined. After brief discussion with an obstetrician, we decided to perform RSS. She was immediately taken to the operating room, and transferred to surgical bed in the right lateral position. Following skin preparations, 2.0 ml hyperbaric bupivacaine 0.5 % and 25 µg fentanyl was injected through L 3/4, and she was positioned to supine. After confirming loss of cold sensation at T10 (9), cesarean section was started. The baby was delivered with the Apgar score of 8/9 at 1/5 min. The decision-delivery interval was 20 min, which was similar to a case series from United Kingdom, where RSS was first reported (22.5 ± 5.9 min; mean ± SD) (8). Many hospitals do not have the local protocol of RSS even in the United Kingdom (11), much less in Japan. Considering possible benefits of rapid sequence spinal anesthesia, we should prepare enough before we use it in the actual clinical situations.

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