

# Patient satisfaction with regional anaesthesia and general anaesthesia in upper limb surgeries: An open label, cross-sectional, prospective, observational clinical comparative study

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## ABSTRACT

**Background and Aims:** An important assessment of the quality of health care is patient satisfaction. However, only few studies are available which look into this aspect. The primary objective of this study was to compare patient satisfaction between regional anaesthesia (RA) and general anaesthesia (GA) in patients undergoing upper limb surgeries. The length of hospital stay and duration of analgesia between the two techniques were the secondary objectives. **Methods:** This cross-sectional study was carried out in a tertiary care teaching hospital. Patients aged between 18 years and 60 years, of physical status American Society of Anesthesiologists (ASA) grade 1–3, undergoing upper limb surgeries were included in the study. Patient satisfaction with anaesthesia was assessed in patients receiving GA and RA, with 100 patients in each group, at least 24 h after the surgery with a 10-item predesigned peri-operative questionnaire. The continuous variables were compared between the groups using Mann–Whitney–Wilcoxon test, and for categorical variables Chi-square test was used. **Results:** The patients in group RA showed significantly higher satisfaction scores than those in GA ( $P < 0.001$ ) with respect to all the 10 items of the questionnaire and the total score. Duration of analgesia was also significantly longer in RA than GA ( $P < 0.001$ ). Duration of hospital stay was also significantly longer in GA than in RA ( $P < 0.001$ ). **Conclusions:** RA for upper limb surgeries provides better patient satisfaction than GA, along with a longer duration of analgesia and lesser duration of hospital stay.

**Key words:** General anaesthesia, patient satisfaction, regional anaesthesia

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## INTRODUCTION

Evaluation of patient satisfaction after anaesthesia is an important parameter, not only as an assessment tool for quality control but also for further improving standards of hospital care.<sup>[1,2]</sup> Patient satisfaction in healthcare industry is approached as a multidimensional construct, one which balances the outcome to expectations.<sup>[1,2]</sup> It includes factors such as ease of the anaesthetic procedure, adverse effects of anaesthetic agents, emotional and interpersonal factors.<sup>[3]</sup> Pascoe defined patient satisfaction as the patient's reaction consisting of a "cognitive evaluation" and "emotional response" to the care they receive.<sup>[1]</sup> Many of the sociodemographic factors, cultural influences, and cognition of the patients are also known to influence patient satisfaction.<sup>[2]</sup>

General anaesthesia (GA) and regional anaesthesia (RA) are the two commonly used techniques for upper limb surgeries.<sup>[4]</sup> However, the technique used by the anaesthesiologist, may not necessarily result in the highest patient satisfaction.<sup>[1,2]</sup> There is no single valid assessment tool to measure patient satisfaction with anaesthesia because of the lack of psychometric

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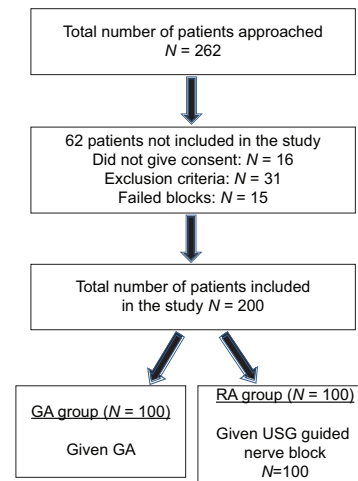
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analysis approaches in studies.<sup>[5]</sup> However, studies from western countries have shown that patients receiving RA for upper limb surgeries have higher satisfaction and longer duration of analgesia with shorter hospital stay when compared with GA.<sup>[6]</sup> Overall, there is scarcity of literature comparing patient satisfaction with RA and GA. In addition, cultural and socioeconomic factors are known to influence patient satisfaction.<sup>[6]</sup> There are no systematic studies in India that have compared patient satisfaction between RA and GA. In this context, we assessed and compared the patient satisfaction following GA and RA in upper limb surgeries and also compared the duration of analgesia and length of hospital stay in between these two groups of Indian patients.

## METHODS

In this open label study, the participants were cross-sectionally assessed to compare patient satisfaction following RA and GA in a tertiary care teaching hospital. The patients were recruited for this study from October 2018 to October 2019. One hundred patients in each group of RA and GA were included in the study after the approval from the Institute's ethics committee. The following were the inclusion criteria of the study: a) patients aged between 18 years and 60 years, b) physical status of American Society of Anesthesiologists (ASA) grade 1, 2, and 3, c) undergoing upper limb surgeries lasting more than 30 min, and d) staying in the hospital for more than 24 h postoperatively. Exclusion criteria were patients on anti-platelet or anticoagulant drugs, patients admitted in intensive care unit (ICU), patients having local infection at site of block, bleeding coagulopathy, delirium or confusion, and uncooperative patients. The treating team anaesthesiologist who did the preoperative evaluation, discussed the pros and cons of GA and RA with the patient for the intended surgery and the kind of anaesthesia (RA v/s GA) to be administered was finally decided by the patient's preference. Ultrasound-guided brachial plexus block is the technique practised in our institute for RA in upper limb surgeries. The patients who had block failure were excluded from the study. Hundred patients who received GA were put in Group GA and the other 100 patients who received RA were put in Group RA [Figure 1]. For patients in RA group, blocks were performed using 15 ml of 0.5% bupivacaine with 15 ml of 2% lignocaine, total volume being 30 ml. For distal humerus surgeries, this total volume of 30 ml was deposited as supraclavicular brachial plexus block, while for forearm surgeries,



**Figure 1:** CONSORT diagram. GA: General Anaesthesia; RA: Regional anaesthesia; USG: Ultrasonography

20 ml was deposited as supraclavicular brachial plexus block and 10 ml as axillary brachial plexus block. The doses were well within the toxic limits (3 mg/kg for bupivacaine and 5 mg/kg for lignocaine). Supraclavicular brachial plexus block with axillary block was performed for forearm surgeries, whereas only supraclavicular brachial plexus block was performed for distal humerus surgery under ultrasound guidance by a qualified anaesthesiologist. Patients in GA were given intravenous glycopyrrolate 10 µg/kg and midazolam 0.05 mg/kg as premedication, fentanyl 2 µg/kg as analgesic, propofol 2 mg/kg as induction agent, atracurium 0.5 mg/kg as muscle relaxant, while depth of anesthesia was maintained with sevoflurane as inhalational agent and intravenous atracurium 0.1 mg/kg. At the end of the surgery, residual neuromuscular blockade was reversed with neostigmine 0.05 mg/kg and glycopyrrolate 10 µg/kg. Other intraoperative analgesics used in GA were intravenous diclofenac (1–2 mg/kg) or paracetamol (10–15 mg/kg). The study participants were educated about the nature of the study, scales used, the basis of rating of the perioperative questionnaire as well as the Visual analogue score (VAS). Written and informed consent was taken from each patient willing to participate in the study. All the routine investigations required for preoperative evaluation and the proposed surgeries were done. All the patients were pre-medicated with tablet alprazolam 0.5 mg overnight and on the morning of surgery. Patients were allowed for a period of absolute fasting of at least 8 h.

Patients satisfaction was measured using a 10-item predesigned perioperative questionnaire,<sup>[2]</sup> in which each item was rated on a numerical rating scale

between 0 and 10.<sup>[2]</sup> This questionnaire has got good psychometric properties to measure patient satisfaction with good reliability (Kappa value >0.75 and Cronbach's alpha 0.84) and validity.<sup>[2]</sup> To achieve a good multidimensional aspect of satisfaction, first four questions are related to the relational aspects between medical staff and patient; next four were about patient's emotional aspects and last two being physical aspects [Table 1]. Patients' satisfaction was assessed either in English or Kannada (regional language of the study centre) using this questionnaire, in a face to face interview by one of the investigating anaesthesiologists. The interview to assess the patient satisfaction was done at least 24 hours after the surgery and as soon as the patient became co-operative to take part in the study. Postoperative analgesia was assessed as per a VAS of 0–10 (Score 0 = no pain, score 10 – most severe pain imaginable) at 12, 24, and 48 h after surgery. Duration of analgesia was recorded as the time for first rescue analgesia with 10-15 mg/kg of intravenous paracetamol, which was the time taken by the patient to first report pain significant enough to require analgesia postoperatively. The length of stay in the hospital was calculated in days from the day of surgery till the day of discharge.

All data were analysed using Statistical Package for the Social Sciences (SPSS) software version 24. The data was not normally distributed as per the Shapiro–Wilk test. The continuous variables were compared between the groups using Independent *t*-test and for categorical variables Chi-square test was used.

## RESULTS

The mean age of the patient and the gender distribution were comparable between the groups [Table 2]. The types of surgeries done in the groups were not statistically significant between the groups [ $P = 0.81$ , Table 3]. The GA group had

higher percentage of patients belonging to ASA 1 category. The total score of patient satisfaction was significantly higher in RA compared to GA in our study population ( $89.5 \pm 4.7$  vs  $74.6 \pm 6.1$ ;  $P < 0.001$ ). The scores of the individual items of the patient satisfaction compared between the groups are mentioned in Table 4. The mean scores of the following items were higher in RA—the kindness shown to them, information provided, feeling of safety, meeting demands, providing attention, and feeling of wellbeing [Table 4]. The GA group had higher scores for postoperative nausea and vomiting and feeling of anxiety items [Table 4]. Mean pain scores, as per VAS after 12 h, 24 h, and 48 h of surgery were significantly less in RA ( $4.0 \pm 1.2$ ,  $4.1 \pm 1.0$ , and  $4.1 \pm 1.1$  vs.  $2.5 \pm 0.7$ ,  $2.6 \pm 0.7$ , and  $2.6 \pm 0.7$ ;  $P < 0.001$ ) [Table 5]. Duration of analgesia was significantly more in RA than in GA ( $6.2 \pm 1.7$  h vs.  $2.5 \pm 1.1$  h;  $P < 0.001$ ) [Table 5]. Mean duration of hospital stay in days was also significantly less in RA than in GA ( $4.7 \pm 1.0$  days vs.  $3.8 \pm 0.6$  days;  $P < 0.001$ ) [Table 5].

## DISCUSSION

We incorporated in our study intraoperative as well as interactive and emotional aspects to assess patient satisfaction based on the background of the anaesthetic technique used. Overall, patients receiving RA were more satisfied in all the above-mentioned measures compared to GA. In addition, patients receiving RA experienced lesser postoperative nausea and vomiting (PONV), greater analgesia, and had lesser duration of hospital stay. Patient characteristics of age, sex, and ASA grading had no influence on satisfaction scores in our study.

Satisfaction for a patient is a fine balance between prior expectations, followed by perceptions of the quality of health care which was actually received.<sup>[1–3]</sup> Higher patient satisfaction sets the benchmark for

Table 1: 10 points Questionnaire

QUESTIONNAIRE	NUMERICAL RATING SCALE (0-10)
Kindness/regard of caregivers	0 (Not kind)→10 (Very kind)
Information given by anaesthetist	0 (No information given) → 10 (Given)
Demands promptly answered	0 (Demands not met) → 10 (Demands met)
Attention to the patient	0 (Attention not given) → 10 (Given)
Feeling safe	0 (Not safe) → 10 (Feeling safe)
Feeling relaxed	0 (Not relaxed) → 10 (Completely relaxed)
Feeling of well being	0 (Not feeling well)→ 10 (Feeling well)
Feeling anxious/frightened	0 (No anxiety/not frightened) → 10 (Excessive)
Pain at the site of surgery	0 (No Pain) → 10 (Worst Pain)
Vomiting/nausea	0 (No vomiting/nausea) → 10 (Excessive)

protocols and approaches toward a patient, whereas poor satisfaction indicates the need for improvement of overall patient care standards.<sup>[1-3]</sup> Thus, it is an important measure of the quality of health care. Satisfaction with anaesthesia is used as an outcome measure in clinical trials.<sup>[2,7,8]</sup> Patient satisfaction is considered to be an integral part of service quality.<sup>[7]</sup> Its measurement is also required to fulfil performance improvement and revalidation agendas for healthcare professionals.<sup>[8]</sup> The items in the scale used in this study assess three aspects of patient satisfaction—physical, emotional, and inter personal.<sup>[2]</sup>

In our study, questions such as “grading of kindness given to patient,” “meeting of patient demands,” “attention given to patient,” and “information provided to them” allowed us to assess the quality of interaction between medical staff and patient.<sup>[9]</sup> This is the measure of the interpersonal aspects related to patient satisfaction. We found that patients

who had undergone RA were more satisfied than GA. As has been shown earlier, interpersonal relationship between patients and the caregivers (including anaesthesiologists and nursing staff) as well as amount of information provided to patients plays a great role in patient satisfaction.<sup>[1,9,10]</sup> In these studies, patients were either predominantly receiving GA or GA and RA in equal proportion. The significant contribution of interpersonal factors and information provided on patient satisfaction has put the focus on caregivers’ soft skills to build relationships, provide adequate information and being empathetic.<sup>[10]</sup> We could not come across any particular study that has compared the interpersonal aspect of patient satisfaction between GA and RA. The possible reason for better patient satisfaction with RA in these interpersonal relationship items may be because they would remain awake intraoperatively and notice the active participation of the caregivers compared to GA. The higher satisfaction scores of RA group subjects in the items on the emotional aspects of patient satisfaction may also be due to the same reason. Emotional aspect of the patient satisfaction was measured by the following items in the questionnaire - “feeling of well-being,” “feeling of safety,” “feeling relaxed,” or “feeling anxious and frightened.” Enquiring the reason for their satisfaction and dissatisfaction systematically and analysing it would provide the exact reason for better satisfaction with RA in Indian patients. Along the expected lines, patients in the RA group had lesser pain at the surgical site and lesser nausea and vomiting compared to GA. This was consistent with numerous studies wherein cases done with RA have shown to be significantly better in pain management and controlling PONV.<sup>[11-14]</sup> The sense of better interpersonal relationship in RA may also be likely linked to better postoperative pain control and lesser nausea and vomiting, as has been showed in previous studies.<sup>[11]</sup>

**Table 2: Demographic data of the subjects**

Variable	General anaesthesia (Mean±SD) or Percentage	Regional anaesthesia (Mean±SD) or Percentage	P
Mean age in years	43.6±13.8	41.6±13.8	0.3
Sex			
Female	30	34	0.54
Male	70	66	
ASA			
1	72	51	0.07
2	28	48	
3	0	1	

**Table 3: The number of patients undergoing different types of upper limb surgeries in the GA and RA groups**

Type of surgery	RA	GA	P
Fracture of both bones forearm	54	59	p=0.81
Radius fracture	26	21	
Ulna fracture	17	16	
Distal humerus fracture	3	2	

**Table 4: Patient satisfaction scores as measured using a 10-item perioperative questionnaire**

Variable	General anaesthesia (Mean±SD)	Regional anaesthesia (Mean±SD)	P
Kindness score	7.3±0.9	8.7±0.7	< 0.001
Information score	8.2±1.1	9.2±0.8	< 0.001
Feeling of safety score	7.0±1.0	8.8±0.8	< 0.001
Demands met score	6.9±1.0	8.7±0.9	< 0.001
Attention given score	6.8±1.0	8.7±0.8	< 0.001
Relaxed feeling score	6.4±1.0	8.6±0.9	< 0.001
Wellbeing score	6.5±1.2	8.7±0.8	< 0.001
Pain score (VAS)	4.0±0.9	2.5±0.7	< 0.001
Nausea score	1.8±0.8	1.3±0.5	< 0.001
Anxious score	1.8±0.7	1.2±0.4	< 0.001

VAS: Visual analogue scale; SD: Standard deviation

**Table 5: The pain scores, duration of analgesia in hours and stay duration in days between two groups**

Variable	General anaesthesia	Regional anaesthesia	P
Pain score after 12 h	4.01±1.15	2.49±0.68	<0.001
Pain score after 24 h	4.05±1.03	2.58±0.69	<0.001
Pain score after 48 h	4.05±1.06	2.58±0.71	<0.001
Duration of analgesia in hours	2.52±1.10	6.15±1.67	<0.001
Stay duration in days	4.73±1.04	3.78±0.61	<0.001

Values are expressed as mean± standard deviation

We found that overall patient satisfaction was significantly higher in RA compared to GA in our study population in line with earlier studies that have shown RA patients to have better patient satisfaction.<sup>[15]</sup> However, contrary findings have also been noted. In a recently published study from Netherlands, patients undergoing distal upper extremity surgery under GA had higher satisfaction compared to RA. The most common reasons for patient dissatisfaction with RA in this study were insufficient RA and patient discomfort with the insensate and uncontrollable extremity postoperatively.<sup>[4]</sup> The possible reason for this difference could be the cultural factors.<sup>[16]</sup> The patients from India may accept the above-mentioned factors of patient dissatisfaction observed during RA in Netherlands, as an integral part of the procedure.

The duration of analgesia after RA in our study is similar to an earlier study from India on upper limb surgeries using RA.<sup>[17]</sup> Since majority of the patients experienced postoperative pain, the longer duration of analgesia may assist the postoperative comfort and recovery.<sup>[18]</sup> In our study, the duration of analgesia was longer in RA than in GA with lesser incidences of post-operative nausea and vomiting in RA in our study. Longer duration of analgesia has its advantages like decreased opioid consumption and decreased length of hospital stay.<sup>[19]</sup> This most likely would have been psychologically more comforting to the patients in the RA group who would feel that more care has been given to them. Another aspect of our study was RA versus GA in Indian population. India is a developing nation and increase in number of drugs used or increase in length of hospital stay adds on to financial burden.<sup>[20]</sup> Drugs used in GA are much more in number and are more expensive as compared to that in RA. Due to better analgesia with RA, lesser analgesic agents are required. Our study showed that RA had lesser duration of hospital stay as compared to GA. This may overall reduce the cost of postoperative care leading to reduced financial burden on patients and the health system. Our findings may also have

significant financial implications for the health policy makers in India as RA is equally safe and effective for upper limb surgeries.<sup>[21]</sup>

Our study has the following limitations. There was no randomisation of the interventions. This would have taken care of the bias of the rater as well as the many biases arising out of patients' and caregivers' preference for a specific anaesthetic technique and would have ensured unbiased data collection and analysis. The questionnaire used to assess the patient satisfaction was not validated for the regional language. We could not systematically study the reasons for patient's dissatisfaction. The types of surgeries done were also heterogeneous and the influence of the same on patient satisfaction was not measured. The decision on postoperative stay was primarily taken by surgical team probably based on the wound healing and we did not explore the other possible factors affecting the length of the hospital stay.

## CONCLUSION

Patient satisfaction with RA for upper limb surgeries in our institute was higher as compared to GA. Variables in our study included longer duration of postoperative analgesia, reduced anxiety, less postoperative nausea and vomiting, along with reduced hospital stay. Better perioperative care provided to the patient by caregivers such as sharing of information, showing kindness, and responding to demands relaxes the patients and gives them a sense of wellbeing and feeling of safety. All these contribute to better patient satisfaction, which was higher in RA than in GA patients.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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