



A Comparative Study of Key Quality Performance Indicators in Anaesthesia and Surgery, between the Years 2013 and 2014, in Operation Theatre at Indian Spinal Injuries Centre, New Delhi

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Abstract

Introduction: *Quality and safety indicators are used to measure and monitor the quality of the services provided to the patients. It encourages an environment of continuous and sustained quality. Clinical indicators in Anaesthesia were first drafted by the United States Joint Commission on Hospital accreditation in 1992. They were included as a part of accreditation process for hospitals in Australian council in Health care standards in 1993. In India in 2006, NABH was established with the objective of enhancing health system and promoting continuous quality improvement and patient safety. It has full functional autonomy in its operation. NABH is a member of ISQua accreditation council. The approval of ISQua authenticates that NABH standards are in consonance with the global benchmarks.*

Aim: *The present study aims to have an assessment of anaesthesia and surgical services at a tertiary level Healthcare standard as given by National Accreditation Board for Hospitals and Health Care.*

Objectives

1. *To analyse the performance of CQI of Anaesthesia and surgical services in the years 2013 and 2014, in line NABH.*
2. *To identify gaps and suggest improvements in Anaesthesia and surgical services.*

Methodology: *It is a retrospective study of key quality indicators, (CQI-NABH) with respect to anaesthesia and surgical services at Indian Spinal Injuries Centre. It is as per COP 13 and COP 14 and CQI.3 standards of NABH 3rd edition 2011. The data for the study was taken from patient records like anaesthesia notes, surgical notes and WHO surgical check safety check list for each patient in the medical record department and from anaesthesia, surgical register in the operation theatre and OT scheduling register available with the OT manager.*

Statistical Analysis: *Data was analysed using average percentage method and MS excel to draw the conclusions.*

Results: *The percentage modification of Anaesthesia plan, unplanned ventilation following anaesthesia, adverse anaesthesia events was less than 1% in both the years and there was no anaesthesia related mortality. Compliance with the WHO surgical safety checklist improved to 98% from 85%. No case of wrong surgery,*

wrong patient or wrong site was reported. But rescheduling increased to 3% from 0.6%. Results were in line with the NABH.

Recommendations: Recommendations have been made to the management to further streamline the OT functions and to ensure 100% compliance of NABH standards.

Introduction

Clinical indicators in Anaesthesia were first drafted by the United States Joint Commission on Hospital accreditation in 1992. They were included as a part of accreditation process for hospitals in Australian council in Health care standards in 1993. In India in 2006, NABH was established with the objective of enhancing health system and promoting continuous quality improvement and patient safety.

A performance indicator has been defined as an explicit measure of some aspect of patient clinical care which is used to judge a particular clinical situation and indicate whether the care delivered was appropriate. They are used a measure of quality and performance. In literature, 108 anaesthetic clinical indicators, of which 53 related to surgical or post-operative ward care have been described. Most were process (42%) or outcome (57%) measures assessing the safety and effectiveness of patient care.

All the facilities and care in the Operation Theatre should meet the standards of accreditation, so that good quality services are provided to the patients, without compromising the safety. Secondly, a large part of the hospital budget is spent on the OT and it is also the major source of revenue generation. So it is imperative that all performance indicators pertaining to Operation Theatre should be fully in consonance with the accrediting national and international bodies.

Our hospital is a NABH accredited hospital since 2012 and is following all the norms, standards and objectives as considered necessary by NABH.

Aim

The present study aims to have an assessment of anaesthesia and surgical services at a tertiary level Healthcare standard as given by National Accreditation Board for Hospitals and Health Care.

Objectives

- 1) To analyse the performance of CQI of Anaesthesia and surgical services in the years 2013 and 2014, in line NABH.
- 2) To identify gaps and suggest improvements in Anaesthesia and surgical services.

Methodology

It was a retrospective study of key quality indicators, (CQI-NABH) with respect to anaesthesia and surgical services at Indian Spinal Injuries Centre. It is as per COP 13 and COP 14 and CQI.3 standards of NABH 3rd edition 2011. Clearance for this study was duly obtained from institutional research review committee and ethics committee Data was collected from 1st January 2013 to 31st December 2014.(comparison of 12 months over two years).All cases under general anaesthesia and regional anaesthesia were taken up for the study. Cases done under Local Anaesthesia were excluded from the study

The performance indicators studied are as mention below:

- a) **Anaesthesia services:** The incidence of anaesthesia related adverse events, modification of anaesthesia plan, unplanned ventilation following anaesthesia and anaesthesia related mortality rate are monitored and analysed as a part of the departmental quality assurance program.
 - Percentage of modification of anaesthesia plan.
 - Percentage of unplanned ventilation following anaesthesia.
 - Percentage of adverse anaesthesia events.
 - Anaesthesia related mortality rate.
- b) **Surgical Services**
 - Percentage of unplanned returned to OT.
 - Percentage of rescheduling of surgeries.

- Percentage of cases where the organization's procedure to prevent adverse events like wrong site, wrong patient and wrong surgery have been adhered to. (Compliance with WHO surgical safety check list)
- Percentage of cases who received appropriate prophylactic antibiotics within 60 minutes of surgery. (WHO surgical safety check list).

The data for the study was taken from patient records like anaesthesia records including (pre-anaesthetic checkup notes, Intraoperative and post-operative), surgical notes and WHO surgical check safety check list for each patient available in the medical record department. And from anaesthesia and surgical register in the operation theatre and OT scheduling register available with the OT manager.

NABH Key quality indicators CQI.3 d, e (pertaining to operation theatre) are calculated as below:

Quality Indicator (QI) report of Operation Theatre-Monthly

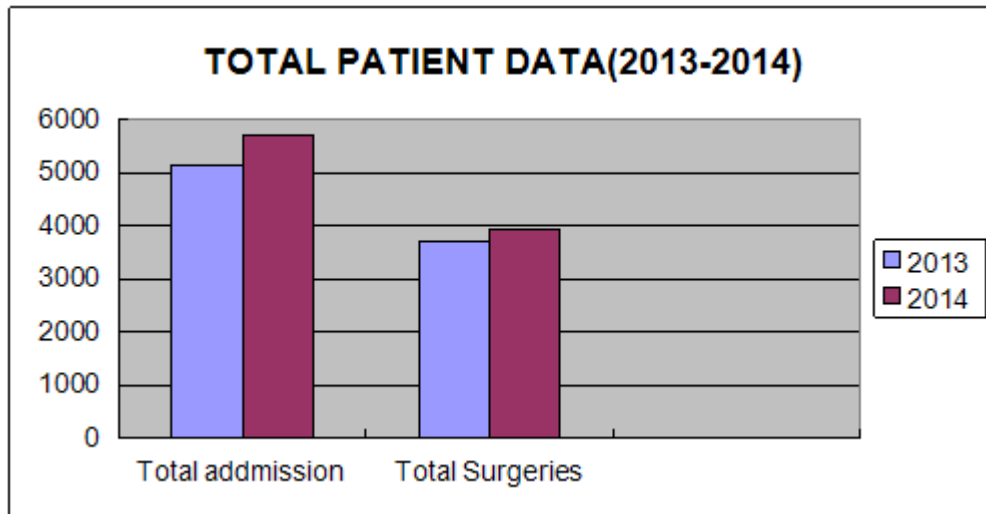
| S. No. | Std. | Indicator | Formula | Calculation | Result (%) | Remarks |
|--------|--------|--|--|-------------|------------|---------|
| 1 | CQI 3d | Percentage of modification of anaesthesia plan | $\frac{\text{Number of patients in whom the anaesthesia plan was modified}}{\text{Number of patients who underwent anaesthesia}} \times 100$ | | | |
| 2 | | Percentage of unplanned ventilation following anaesthesia | $\frac{\text{Number of patients requiring unplanned ventilation following anaesthesia}}{\text{Number of patients who underwent anaesthesia}} \times 100$ | | | |
| 3 | | Percentage of adverse anaesthesia events | $\frac{\text{Number of patients who developed adverse anaesthesia event}}{\text{Number of patients who underwent anaesthesia}} \times 100$ | | | |
| 4 | | Anaesthesia related mortality rate | $\frac{\text{Number of patients who died due to anaesthesia}}{\text{Number of patients who underwent anaesthesia}} \times 100$ | | | |
| S.No | Std. | Indicator | Formula | Calculation | Result (%) | Remarks |
| 5 | CQI 3e | Percentage of unplanned return to OT | $\frac{\text{Number of unplanned return to OT}}{\text{Number of patients operated}} \times 100$ | | | |
| 6 | | Percentage of rescheduling of surgeries | $\frac{\text{Number of cases rescheduled}}{\text{Number of surgeries performed}} \times 100$ | | | |
| 7 | | Percentage of cases where the organization's procedure to prevent adverse events like wrong site, wrong patient and wrong surgery have been adhered to | $\frac{\text{Number of cases where the procedure was not followed}}{\text{Number of surgeries performed}} \times 100$ | | | |
| 8 | | Percentage of cases who received appropriate prophylactic antibiotics within the specified time frame | $\frac{\text{Number of patients who did not receive prophylactic antibiotic(s)}}{\text{Number of surgeries performed}} \times 100$ | | | |

Key data – month wise was collected in the form given above, for 24 months starting from Jan 2013 to Dec 2014. And then compiled and compared on yearly basis.

Results

1. In the year 2013, total admissions were 5118 out of which 3717 operations were done. In the

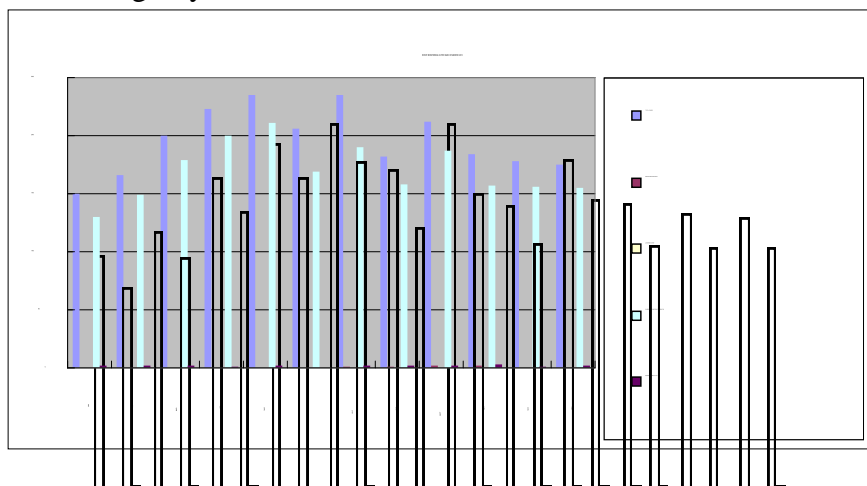
year 2014 total admissions were 5698 and 3931 were operated. This shows an increase by 10%.

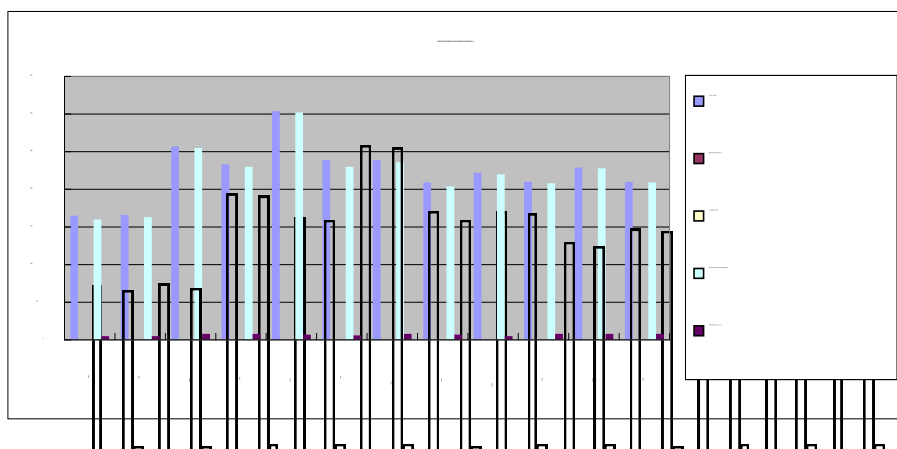
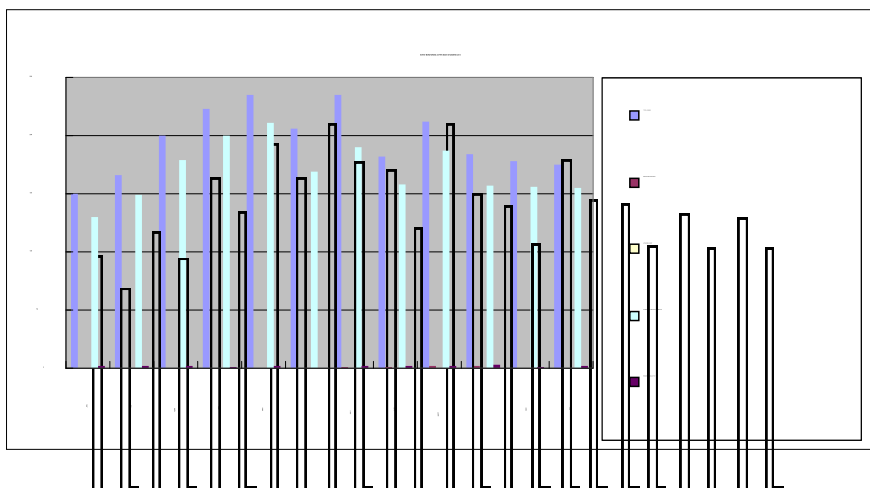
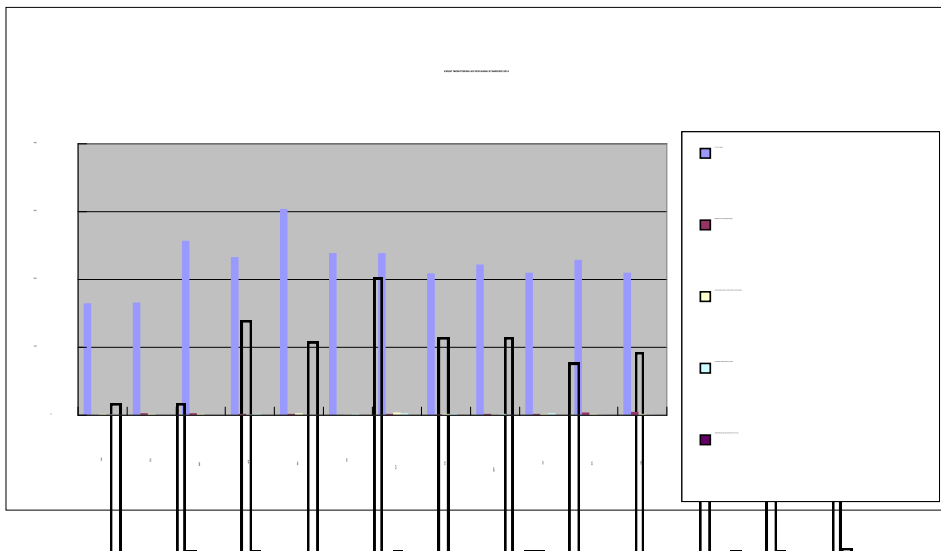


2. Cases done in 2013 and 2014

| CASES DONE UNDER | GRAND TOTAL | |
|---------------------------|-------------|------|
| | 2013 | 2014 |
| General Anesthesia | 1540 | 1876 |
| Spinal Anesthesia | 316 | 353 |
| Combined Spinal Epidural | 376 | 312 |
| Regional blocks | 45 | 86 |
| Monitored Anesthesia Care | 69 | 56 |
| Total Number of Cases | 2346 | 2683 |

3. Event monitoring in years 2013 and 2014.





As shown in the tables above, the key quality indicators are as per NABH standards COP13 and COP 14, related to anaesthesia and surgery. During both years of the study the percentage of unplanned ventilation, adverse anaesthetic events, re-exploration of cases, etc were all less than 1%. In fact there has been significant improvement in compliance related to antibiotic and WHO surgical safety check list in the Operation Theatre were about 86% to close to 98%. Rescheduling of cases on the other hand has increased to 3%. This can be attributable to various factors discussed below.

Discussion

Since NABH came into inception in 2006, there are very few studies about comparison and analysis of NABH standards. In fact this is first of its kind to compare COP13 and COP 14 simultaneously in the OT of two consecutive years. Both standards highlight about anaesthesia and surgical services in a health care organization. Also they were compared and analyzed with national and international data. All deficiencies or problems were brought to notice and remedial measures were suggested to further improve the OT processes and streamline the patient care without compromising the patient safety. This was the main aim and objectives of this project. I shall discuss one by one all these important aspects of patient care.

Modification of anaesthesia plan

In our institution the overall incidence is less than 1% which is comparable to any other peer institution nationally or internationally. Moreover majority of our cases are spine surgeries where general anaesthesia is the only option, so there are less chances of modification in anaesthesia plan. Comparison wise there are more cases in 2014 in which modification of anaesthesia plan was required because of increased number of surgical cases in 2014. Apart from this in 2014, cases related to general orthopaedics and knee arthroplasties increased in number. In these cases

usually regional anaesthesia is given, which is sometimes inadequate and general anaesthesia is then required. Other factor could be better documentation and reporting of cases.

Unplanned ventilation

Our year to year comparison showed that numbers of unplanned ventilation cases were less during 2014 than 2013. Incidence of average two cases per month out of average 220 cases per month, done under general or regional anaesthesia is comparable to any national or international data. This has been possible because of better monitoring of patients, vigilance, thorough preoperative evaluation and adequate number of staff including anaesthetists.

Common reasons for shifting on unplanned ventilation at our centre were:

1. Hemodynamic instability
2. Prolonged surgery
3. Poor respiratory effort
4. Massive Blood loss
5. Delayed recovery from anaesthesia

Prevention

It is seen from above that multiple factors influence the overall patient outcome and risk. Early recognition of complications, timely intervention and intensive monitoring is the key to avoid unfavourable outcome. Unfavourable outcome can be prevented with more knowledge, availability of better drugs, techniques and monitoring equipments

Anaesthesia Related Morbidly

If we compare the incidences between years 2013 and 2014, adverse events in the operation theatre have increased from 0.43% to 0.63% but when we compare it with national or international data, the incidence is still within acceptable range. Increase in number could be due to better reporting of the incidences, increased awareness among the staff and patients and better documentation and record keeping by the staff.

Prevention

Despite all the advances implemented to date, there still remains room for improvement to reduce anaesthesia related mortality. So far main emphasis has been in raising awareness, education, training and standardization of protocols. However now the processes associated with anaesthesia and surgery, have increased in complexity, the patient population dynamics have also changed, presenting more complex comorbidities at the time of surgery. These complexities present their own challenge and require an alteration in the paradigm of care that extends beyond an individual approach to embrace a system based approach to reduce complications and adverse events.

Following steps would further improve the patient care and safety.

- **Perioperative Care**

Includes optimal preoperative evaluation and preparation, optimal management of blood loss, adequate supervision and adequate facilities. A coordinated effort at organization level is required to provide optimal perioperative care to an ever-increasing high risk population presenting for complex surgical procedures.

- **Human Errors**

Staff should be experienced or competent to handle difficult and complex surgeries. Clinical guidelines based on best practice, such as protocols, consensus guidelines and evidence based recommendations are advocated to overcome limitations, however compliance, both organizational and individual, remains a problem.

- **Teamwork and Communication**

Several studies have shown lesser rate of complications with better communication and collaboration of the operating room care team. Methods initially developed in the aviation industry, such as crisis resource management and simulation are invaluable in improving teamwork, are being integrated into healthcare settings. In

addition to improved teamwork, they are designed to foster better leadership, situational awareness, stress management and maintenance of core skills.

- **Organizational Factors**

Good organization, management structure and procedures can decrease the morbidity. Avoid staff shortages, poor skill mix, busy rotas, frequent distractions, frequent on-calls, disruptive shift patterns and fatigue. Ensuring a culture of safety is extremely important. Integrated programmes of quality improvement alongside quality assurance and key elements of safety culture are important to improve the quality of care at the organizational level.

Anaesthesia Mortality

In our institution we included any death related to anaesthesia in the operation theatre, or after 12 hrs of surgery of operating procedure. There was no case of anaesthesia or surgical related mortality in these two years that is 2013 and 14. This may be because of thorough pre anaesthetic evaluation, cross consultation with other specialities, intensive intra operative monitoring and involvement of whole anaesthesia team in dealing with all high risk procedures. All these high risk cases were fully backed up by ICU team and cardiologists. If we compare the incidences between years 2013 and 2014, adverse events in the operation theatre have doubled from 0.43% to 0.63% but when we compare it with national or international data, the incidence is still within acceptable range. Increase in number could be due to better reporting of the incidences, increased awareness among the staff and patients and better documentation and record keeping by the staff.

WHO safety checklist compliance (Wrong surgery, wrong part and wrong patient), Antibiotics compliance within 60 minutes of surgery

In this study we present data on the implementation of the WHO checklist. Comparing the two years 2013 and 2014 it is found that implementation was about 85% in 2013 and about

95% in 2014. There is definitely improvement by about 10%. But the targeted overall compliance should have been near 100%.

Same trend was also observed for antibiotics compliance as per WHO check list. There is definitely need for 100% compliance. One important observation was that there was not a single case of wrong patient, wrong part surgery among all these surgeries. This might have happened due to various checks at different points. Part preparations and marking at ward, again ensuring during handing over by the ward nurse to the OT nurse and use of identification wrist tag worn by the patient.

The efficacy of the checklist was found to be correlated with correct performance of briefing. In our hospital it was found to be present in all patients' charts but, in only 85% to 95% cases, they were completely filled.

The checklist will meet the acceptance only if the physician team leaders ensure the following:

- Integrate in their safety concept.
- Take it seriously.
- Provide a role model as an example to others by using it themselves.
- Interdisciplinary communication helps prevents conflicts in the operation room about implementation.
- A team that has had some practice in the use of the checklist can complete all three parts of it in about two minutes.

Rescheduling

In our practice at Indian Spinal Injuries Centre, surgical block time is expandable, i.e. surgeons are assigned block time which is expandable to meet their case loads. Surgeries are rarely cancelled even if the day runs over. Furthermore, in our integrated academic, physician led multi-specialty practice; the majority of surgical patients undergo evaluation in our preoperative anaesthetic evaluation (PAC) and cross consultation by other consultants. Also there is convenient timely communication among surgeons, anaesthesiologists and OT manager.

Herein, a retrospective comparison over 24 months showed that rescheduling has increased to 3.09% from 0.9% due to various reasons. Prime reason was increase in number of cases every year by 10% and increase in turnaround time apart from long duration and high risk spine surgery cases.

Re-exploration

If we see the comparison between the years 2013-14 the graph shows less number of cases of re-exploration on 2014. They are mainly re-explored due to infection at the surgical site. There was only one case for the control of re-bleeding from the surgical site. Two cases were due to the dislocation of the hip joint after the surgery. In one case there was leak in anastomosis after colonic surgery. SSI remains the main cause of re-exploration. But the number of incidence has decrease in 2014 due to:

- Better pre-operative optimization of patients
- Improved compliance in W H O safety check list
- Administration of prophylactic antibiotics within 60 minutes of incision
- Decreased the duration of surgeries performed. In prolonged surgery antibiotics were repeated after four hours of incision time.
- Surgical drains removed after 24-48 hrs of surgery as they are significantly associated with occurrence of SSI.
- Conducted periodic surveillance to keep a check on SSI.

Conclusion

- 1) Our hospital which is a NABH accredited hospital since 2012 is following all quality norms as per the guidelines issued by NABH in 3rd edition, 2011.
- 2) The key quality performance indicators in the years 2013 and 2014 are in consonance with national standards. Our services are at par with other institutions of the country.

- 3) Anaesthesia related morbidity, unplanned ventilation following anaesthesia and mortality, is less than 1%. No case of mortality due to anaesthesia and surgery within 12 hours was reported.
- 4) There was no case of wrong surgery, wrong patient or wrong site during these 2 years.
- 5) Compliance with WHO surgical safety checklist improved to 98% from 85% during the period under the study.
- 6) Prophylactic antibiotic administration within 60 minutes of start of surgery, also improved to 98% in 2014 from 85% in 2013.
- 7) Rescheduling is the major issue. It increased from 0.63% in 2013 to 3% in 2014. There were many cases of cancellation due to patients not reporting for surgery on the stipulated day, delay in financial clearance and over-running of the OT, due to increased number of cases and OT running up to late evening.
- 8) Also as, there is no separate Operation Theatre and slot for emergency cases, listed OT cases are delayed and sometimes have to be rescheduled in case of addition of any emergency case or add-on list cases.
- 9) There were few cases (0.5%) of re-exploration. Surgical site infection (SSI) was found to be the major cause in most of the cases.
- 10) Modification of anaesthesia plan was also within the acceptable limits. This could be further improved by better Pre Anaesthetic Check Up, counselling and better technique and more usage of Ultrasound machine for regional blocks. Ultrasound guided techniques for regional anaesthesia are more precise and accurate and improve the success of the block and prevents need for change of anaesthesia plan.

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