Compliance of World Health Organization Surgical Safety Checklist in a Tertiary care Hospital in Nepal - Prospective Observational Study

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Abstract

Introduction: Inhalational anaesthesia is a preferred technique of induction in children. Halothane has been commonly used for inhalational induction. Sevoflurane with low blood gas solubility and pleasant odor allows rapid induction, early and smooth emergence. The study was conducted to observe effects of sevoflurane and halothane on hemodynamics during induction of general anaesthesia using laryngeal mask airway in children.

Methods: This prospective, observational study was conducted among 60 ASA PS I children aged 2 - 12 years. The two groups of children undergoing surgery with halothane and sevoflurane induction were compared. Heart rate, mean arterial pressure and complications were observed between two groups.

Results: The two groups were comparable in terms of age, weight, sex distribution, ASA status and surgical procedure. There was no significant difference in heart rate and mean arterial pressure during pre - induction, loss of eyelash reflex, immediately after LMA insertion and then 3 mins and 5 mins later. There were two cases of arrhythmia in halothane group and two cases of laryngospasm in sevoflurane group.

Conclusions: There was no significant difference in effects of sevoflurane and halothane on hemodynamics during induction of general anaesthesia using LMA in paediatric patients. Hence, both agents can be safely used.

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INTRODUCTION

Surgery has been one of the fundamental aspects of medical care since ages. Increase in incidence of disease conditions has led to increase need of surgical intervention, which in turn has played an integral part in global healthcare delivery.[1,2] Millions of people undergo surgery annually worldwide and sometimes surgery is the only option of treatment. Surgical interventions account for 13% of world's total disability-adjusted life years.[3] It is done to alleviate and cure diseases, and save lives, on the other hand unsafe surgical intervention can cause substantial harm.[4] Complications are not uncommon and may occur in 3 - 16% of all surgical procedures, with permanent disability or mortality ranging from 4 - 0.8% in all surgical procedures in western world.[5,6] The incidence of surgical complications may be even higher in under-developed and developing countries. Many of these complications may be due to preventable or modifiable causes.[7]

Delivery of safe and standard healthcare is of utmost importance in modern era and there is no room for errors. With development of the newer technology and equipment, healthcare delivery has become safer. Further checklist, protocols, standard operative procedures play significant role in minimizing errors during surgery in the operation theatre. World Health Organization (WHO) has taken a number of global and regional initiatives to address surgical safety and has concentrated on a fact that "Safe Surgery Saves Lives".[8] WHO published the WHO Surgical Safety Checklist in 2008 in order to increase the safety of patients undergoing surgery.[9] The checklist serves to remind the surgical team of important items to be performed before and after the surgical procedure in order to reduce adverse events such as surgical site infections or retained instruments.[9,10] Even though there are guidelines and protocol for patient safety, there seems to be lack in compliance in following these safety guidelines which contributes to mishaps and endangers patient safety.

This study aims to find out the compliance of WHO surgical safety checklist and contribute to safety of surgical patients in Shree Birendra hospital, Chhauni, Kathmandu, Nepal.

METHODS

This is a prospective, observational study done at Shree Birendra Hospital, a 630- bedded tertiary care military hospital located in Chhauni, Kathmandu, Nepal. The data was collected over a period of six months from July 2022 to December 2022, where a total of 400 patients undergoing elective surgical procedures were included. All patients with age more than 18 years, undergoing elective surgical procedures were included in this study whereas patients below18 years and patient undergoing emergency surgical procedures were excluded from the study. For calculation of the sample size, Cochran formula was used,

Sample size (n) = $Z^2p.q/e^2$

Where,

Z = Confidence interval, (95% = 1.96)

P = Prevalence for maximum compliance of the checklist is 50% (assumption)

q = (1-p) = (1-0.5) = 0.5

e = margin of error 5%

Hence, sample size = 385

However, a total of 400 samples were taken for the study. Data were collected from seven departments of the hospital- GI and General surgery, Urosurgery, Orthopedics, Obstetrics and Gynaecology, Ear, nose, and throat (ENT) surgery, Neurosurgery and Ophthalmology. The WHO surgical safety checklist is routinely used for all surgical procedures in the present institution. It is conducted by the nursing staffs, anaesthesia and surgery residents and consultants. A detailed clinical history and thorough clinical examination were done and recorded in a predesigned proforma. The data for the compliance of use of surgical safety checklist were collected from the WHO surgical safety checklist in the case sheet of the patient who underwent surgical procedures, and its compliance were checked based on completion of Sign In, Time out and Sign Out part of the checklist. Statistical analysis was performed by using the IBM SPSS version 24.0. Quantitative data were presented as mean and SD. Qualitative data were presented as number and percentage. The study was approved by the Ethics Committee Reg. no. 733, Institutional review Committee (IRC) of Nepal Army Institute of Health Sciences (NAIHS).

RESULTS

A total of 400 patients were included in this study, the distribution of elective cases across different specialties has been illustrated in Table 1.

Table 1: Speciality of the elective cases among patients

Specialty of the elective cases	Total N (%)
General and GI surgery	156 (39%)
Urosurgery	55 (13.75%)
Orthopedics	67 (16.75%)
Gynecology	47 (11.75%)
Neurosurgery	35 (8.75%)
Ophthalmology	23 (5.75%)
ENT	17 (4.25%)
Total	400 (100%)

The compliance for the Sign-in Period was assessed based on WHO Surgical Safety Checklist items. Patient confirmation of identity, site, procedure, and consent were reported as complete in 371 (92.75%) cases and incomplete in 29 (72.5%) cases. Site marking was indicated and completed in 275 (68.75%) cases, while it was not indicated in 125 (31.25%) cases. Hair removal was marked as complete in 376 (94%) cases and incomplete in 24 (6%) cases. The placement and functioning of a pulse oximeter were complete in 387 (96.75%) cases and incomplete in 13 (3.25%) cases. Allergy-related checks were reported as complete in 389 (97.25%) cases and incomplete in 11 (27.5%) cases. For the assessment of difficult airway or aspiration risk, 347 (86.75%) cases were marked as complete, and 53 (13.25%) cases were incomplete. The evaluation of the risk of > 500mL blood loss (or 7 mL / kg for children) showed 353 cases (88.25%) were complete, and 47 (11.75%) cases were incomplete. This has been demonstrated in Table 2.

Table 2: Compliance with WHO Surgical Safety Checklist for Sign-in Period

Checklist items	N (%)
Patient confirmed identity, site, procedure, and consent Complete Incomplete	371 (92.75%) 29 (72.5%)
Site marked Not indicated Indicated	275 (68.75%) 125 (31.25%)
Hair removal Complete Incomplete	376 (94%) 24 (6.0%)
Pulse oximeter placed and functioning Complete Incomplete	387 (96.75%) 13 (3.25%)
Allergy Complete Incomplete	389 (97.25%) 11 (27.5%)
Difficult airway or aspiration risk Complete Incomplete	347 (86.75%) 53 (13.25%)
Risk of > 500mL blood loss (7 mL / kg for children) Complete Incomplete	353 (88.25) 47 (11.75%)

During the Time-Out period of the WHO Surgical Safety Checklist, compliance with various checklist items were assessed. The confirmation of all team members introducing themselves by name and role were reported as complete in 348 (87%) cases and incomplete in 52 (13%) cases. Verbal confirmation of the patient's name, surgical site, and procedure by the Surgeon, Anaesthesia, and Nurse were complete in 371 cases (92.75%). Crucial events anticipated by the surgeon, anaesthetist, and Nursing Team were marked as complete in 345 (86.25%) cases and incomplete in others. Antibiotic prophylaxis administered within 60 minutes before incision was complete in 371(92.75%) cases. Essential imaging display was complete in 140 (35%) cases, while 260 (65%) cases were incomplete as depicted in Table 3.

For the Sign-Out period of the WHO Surgical Safety Checklist, adherence to the checklist items was assessed. Oral confirmation of the name of the procedure was reported as complete in 294 (73.5%) cases and incomplete in 106 (26.5%) cases. Regarding the oral confirmation of the completion of instrument, sponge, and needle counts, it was complete in all 400 (100%) cases. The collection of surgical specimens and labelling was complete in 358 (89.5%) cases, incomplete in 3 (0.75%) cases, and not applicable in 40 (10%) cases.

Table 3: Compliance with WHO Surgical Safety Checklist for Time- Out period

Checklist items	N (%)
Confirm all team members introduced themselves by name and role Complete Incomplete	348 (87%) 52 (13%)
Surgeon, Anesthesia and Nurse verbally confirm the patient's name, Surgical Site, Procedure Complete Incomplete	371 (92.75%) 29 (7025%)
Crucial events anticipated by surgeon, anesthetist and Nursing Team Complete Incomplete	345 (86.25%) 55 (13.75%)
Antibiotic prophylaxis given within 60 min before incision Complete Incomplete	371 (92.75%) 29 (70.25%)
Essential imaging displayed Complete Incomplete	140 (35%) 260 (65%)

Equipment-related problems were reported as complete in 128 (32%) cases and incomplete in 272 (68%) cases. Lastly, oral confirmation of key concerns for recovery and management was complete in 213 (53.25%) cases and incomplete in 187 (46.75%) cases as shown in Table 4.

Table 4: Compliance with WHO Surgical Safety Checklist for Sign- Out period

Checklist items	N (%)
Oral confirmation of name of procedure Complete Incomplete	294 (73.5%) 106 (26.5%)
Oral confirmation of completion of instrument, sponge, and needle counts Complete Incomplete	400 (100%) 0
Collection of surgical specimen and labelling Complete Incomplete Not applicable	358 (89.5%) 03 (0.75%) 40 (10%)
Equipment-related problems Complete Incomplete	128 (32%) 272 (68%)
Oral confirmation of key concerns for recovery and management Complete Incomplete	213 (53.25%) 187 (46.75%)

DISCUSSION

The Surgical Safety Checklist, formulated by the WHO, is designed to elevate patient safety standards. The objective of this study was to identify areas of non-compliance and inefficiency within our perioperative procedures. By doing so, we aimed to develop a comprehensive strategy to effectively implement the checklist, leading to heightened perioperative patient safety and a reduction in postoperative complications. Furthermore, our study aimed to enhance understanding and awareness among our staff about the importance of employing this checklist in our routine operations.

In our study, we found an overall compliance rate of 312 (78%), with the Sign-in phase displaying the highest adherence at 342 (85.5%). However, the compliance rates for the Time-out and Sign-out phase were slightly lower, at 315 (78.75%) and 278 (69.5%), respectively. These findings closely parallel a study, where lower levels of compliance were observed for the "time-out" and "sign-out" phase of the checklist when compared to the "sign-in" phase.[10,11] In a systematic review conducted by Borchard et al in 2012, it was noted that the adherence to the surgical checklist varied widely, ranging from 12% to 100%, with an average compliance rate of 75% with the highest level of compliance 90%, was observed during the Time-out phase of the checklist.[12] The variation in adherence rates between the initial and subsequent sections of the checklist could potentially be attributed to the contrasting nature of these segments. The initial section is more focused on documentation and paperwork, whereas the latter two sections necessitate active verbal communication among the surgical team members within the operating theater. This distinction in communication dynamics might have contributed to the differences in compliance rates observed. The underlying reason for this inconsistency could be a lack of awareness concerning the safety benefits linked to proper implementation of the checklist.[13,14]

The compliance rate for evaluating the risk of bleeding 353 (88.25 %) and difficult airway 347 (86.75%) during the "sign-in" phase was comparatively low. This was often attributed to the perception among surgeons that these steps were of lesser significance, especially when dealing with patients who appeared to be in good health. During the "time-out" phase, 315 (78.75%) cases were fully completed, while 85 (21.25 %) remained incomplete. Among the completed cases, patient identities were successfully reconfirmed, but in 52 (13%) cases, this crucial step was missing. Additionally, antibiotic prophylaxis was administered in only 370 (92.75 %) cases. Moving to the "sign-out" phase, 278 (69.5%) cases were fully completed, whereas remaining was left incomplete. Within the completed cases, counts for instruments, sponges, and needles were properly conducted in 100% of cases. Equipment-related issues were documented in 128 (32%) cases. In a study by Vogts et al they observed a notable omission of the Sign Out phase similar to our study which raises concerns about the potential for missed information that could compromise postoperative care.[14] It is crucial to recognize the inherent limitations of our study, which primarily pertain to its localized nature and potential lack of immediate generalizability to other tertiary care hospitals.[15,16]

Surgery plays a crucial role in the modern healthcare setup by providing solutions to a wide range of medical conditions. Be it lifesaving emergencies or planned elective operations, surgery has the potential to alleviate patients' suffering and improve their quality of life. Unfortunately, there have been many instances where despite best intentions on the part of health care givers, surgery has resulted in adverse outcomes.[14-16] Despite these constraints, our study serves as a valuable model for conducting comparable assessments in other prominent healthcare establishments.

CONCLUSIONS

Our study provides valuable information about the checklist compliance at our tertiary care hospital. We identified areas that require specific interventions and commendable successes by comparing our results to current worldwide standards. Our study calls for promoting interdisciplinary cooperation, putting in place programs for ongoing training, and creating an environment where patient safety is prioritized.

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