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Improving compliance with hospital accreditation standards for anesthesia through repetitive feedback and education : a cross-sectional study

J. Ringoir (*), S. Van Biesen (**), J. Pauwels (***), E. Pannier (***), P. Wouters (*), M. Van de Velde (**), W. Swinnen (***)

Abstract : *Background* : Compliance with quality and patient safety guidelines for anesthesia is important but difficult to obtain. Many hospitals worldwide are preparing for or passing an accreditation process with Joint Commission International (JCI), with anesthesia teams endeavoring optimal conformity with these JCI guidelines. Requirements involve pre-anesthesia assessment, informed consent, pre-induction assessment, a safe surgery checklist, anesthesia record keeping and correct postoperative care.

Objectives : Our primary goal was to improve quality of anesthesia care and patient safety through optimization of perioperative flow and anesthesia file documentation, by addressing issues with the implementation of key anesthesia requirements, the required steps to achieve optimal compliance and the need for sustained efforts to maintain quality standards or continue improvement. Our secondary goal was to consolidate progress and to prevent a decrease in compliance, by continuing to measure compliance and by giving feedback up to 2 years later.

Methods : Postoperatively, all records of patients undergoing general or regional anesthesia were assessed on completeness. Compliance was measured at baseline, during the 4 months before and after the JCI-audit, and at 1 year (1y) and 2y follow up study periods. Process improvements were done in all study periods, except when preparing the 1y follow up study period. Statistical analysis was performed using the Cochran-Armitage trend test, Chi Square, Fischer Exact and ANOVA tests. Results with $p < 0.05$ were considered statistically significant.

Results : Significant improvement in compliance was observed in pre-anesthesia assessment, informed consent, pre-induction assessment, and anesthesia record keeping. One year later, however, improvement was not sustained for pre-anesthesia assessment and informed consent. New interventions preparing the two year follow up study period significantly improved compliance with these requirements.

Conclusion : This study shows the strong potential for improving compliance with JCI Standards for Anesthesia, through streamlining procedures, intensive communication and accurate follow-up. The damping effect late after stopping the communications shows that it is important to persevere much longer than previously thought.

Keywords : Anesthesia ; workflow ; quality ; patient safety ; guideline adherence ; accreditation.

Introduction

Improvement of quality and patient safety (QPS) has been one of the hottest topics in healthcare for decades. Unfortunately, the road to optimal QPS often appears to be a long and winding road. It usually takes years for health care professionals to adopt government requirements or guidelines from professional organizations. Healthcare organizations therefore often rely on hospital accreditation organizations to help them achieve and consolidate these improvements. Az Sint-Blasius General Hospital decided to be guided by Joint Commission International (JCI) for this journey. JCI is an American nonprofit organization, assisting organizations (hospitals, clinics, governments, …) worldwide to improve patient safety and quality of health care by education, advisory services, and

Jolien Ringoir, MD ; Stefaan Van Biesen, MD ; Johan Pauwels, MD ; Elise Pannier, MD ; Patrick Wouters, MD, PhD ; Marc Van de Velde, MD ; Walter Swinnen, MD.
(*) Ghent University, Ghent University Hospital, Department of Anesthesiology, B-9000 Ghent, Belgium.
(**) KU-Leuven, University Hospitals Leuven, Department of Anesthesiology, B-3000 Leuven, Belgium.
(***) AZ Sint-Blasius, Department of Anesthesiology, B-9200 Dendermonde, Belgium.
Corresponding author : Walter Swinnen, Dpt of Anesthesiology, AZ Sint-Blasius, 50 Kroonveldlaan, 9200 Dendermonde, Belgium. Tel. +32 52252715, Fax +32 52252390.
E-mail : walter.swinnen@azsintblasius.be

Dr. Ringoir and Dr. Van Biesen participated equally in the study.
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international accreditation and certification. JCI developed rigorous standards of care, assisting healthcare professionals to achieve high levels of quality. A JCI accreditation process appears to be a useful to reach this higher level of quality much faster.

Anesthesia and Surgical Care are key processes in QPS in hospitals (1, 2). Anesthesia teams play an important role in the perioperative process, and are ideally placed to provide, monitor and follow up on patient care during the patient's stay. Applying William Edwards Deming's quote 'Uncontrolled variation is the enemy of quality', standardization of the perioperative process will result in better Operating Room (OR) planning and more efficient patient flows, reducing last minute postponement of surgery, and in improved quality and safety for the surgical patient. On the other hand, standardization is often used to increase productivity and may lead to forcing patients in fast-track lanes (3). This increases the risk to overlook individual pitfalls and may introduce a false sense of accomplishment and safety. Finally, the OR is a complex and multidisciplinary environment, and the process of planning and implementing improvements and sustaining them by obtaining and maintaining good compliance, proves to be a challenging one (4, 5).

Our primary goal was to improve quality of anesthesia care and patient safety through optimization of perioperative flow and anesthesia file documentation and by addressing issues with the implementation of key anesthesia requirements, with the required steps to achieve optimal compliance, and with the need for sustained efforts to maintain quality standards or continue improvement. The domain of our study spreads from purely anesthesia guidelines to where these overlap with those from other departments, as they do in the JCI standards. The pressure of preparing a JCI-audit during a 4-month pre-audit period was used to achieve optimal compliance faster.

Since earlier work has demonstrated a tendency for compliance to decline after initial improvement (4, 5), our secondary goal was to consolidate progress and prevent this compliance drop, by continuing to measure compliance and by continuing to give feedback in a 4-month post-audit period and at 1 year and 2 years after the post-audit study period.

Methods

This cross-sectional study was performed in az Sint-Blasius general hospital (Dendermonde, Belgium), a regional general hospital with university affiliation. The study was approved by the Committee for Medical Ethics (az Sint-Blasius, Kroonveldlaan 50, 9200 Dendermonde, chair Dr. Sabine Serry, approval on November 26th 2014 and December 15th 2015). Since patient files were postoperatively screened, patient informed consent was not required.

Setting requirements

JCI Accreditation Standards for Anesthesia defined the requirements in this study.

A new standardized workflow was designed to meet the JCI Standards (1, 2) and introduced shortly before we conducted our baseline measurements. For each item, the corresponding JCI Standard was translated into a number of required documents (Table 1) : pre-anesthesia assessment, informed consent, pre-induction assessment, the correct use of a safe surgery checklist, anesthesia record keeping and correct postoperative care.

Study periods

Data were collected during five study periods. We started collecting baseline data during the last two weeks of November 2014. In the pre-audit study period we collected data during the last two weeks of the months December 2014, January, February and March 2015 (Audit-4, Audit-3, Audit-2, Audit-1). No data were collected during the JCI accreditation audit (April 20th-24th 2015). The post-audit study period included the last two weeks of the months May, June, July and August 2015 (Audit+1, Audit+2, Audit+3, Audit+4).

Long term follow up data were collected annually during the last two weeks of August 2016 (1 y follow up study period) and of August 2017 (2 y follow up study period).

Inclusion criteria

All surgical interventions under general or regional anesthesia or deep sedation in the 10 ORs of az Sint-Blasius were included.

Exclusion criteria

We also excluded patients undergoing urgent surgery (planned less than six hours preceding admission to the OR), surgery during nights or weekends, surgery under local anesthesia and interventions taking place outside the OR. We also excluded patients with missing data.

Table 1

JCI Standards & Required documents

	JCI Standard & Intent	Required documents
Pre-anesthesia assessment	ASC 4: A qualified individual conducts a pre-anesthesia assessment and pre-induction assessment	Assessment by any physician, showing medical history, medication, allergy, physical examination, and if needed, results of complementary examinations. Preoperative questionnaire, to be completed by the patient or his legal representative.
Informed consent	ASC 3.3: The risks, benefits, and alternatives related to procedural sedation are discussed with the patient, his or her family, or those who make decisions for the patient ASC 5: Each patient's anesthesia care is planned and documented, and the anesthesia and technique used are documented in the patient's record ASC 5.1: The risks, benefits, and alternatives related to anesthesia are discussed with the patient, his or her family, or those who make decisions for the patient.	Informed consent, written, to be completed and signed by both the patient and the anesthesiologist, mentioning the type of anesthesia, Mallampati classification and ASA-classification.
Pre-induction assessment	ASC 4: A qualified individual conducts a pre-anesthesia assessment and pre-induction assessment	PIA to be completed by the anesthesiologist in the anesthesia file.
Safe Surgery Checklist	IPSG 4: The hospital develops and implements a process for ensuring correct-site, correct-procedure, and correct-patient surgery. IPSG 4.1: The hospital develops and implements a process for the time-out that is performed in the operating theatre immediately prior to the start of surgery to ensure correct-site, correct-procedure, and correct-patient surgery.	SSC checked and signed by anesthesiologist, active participation in Time Out hard stop before incision.
Anesthesia record keeping	ASC 5: Each patient's anesthesia care is planned and documented, and the anesthesia and technique used are documented in the patient's record ASC 6: Each patient's physiological status during anesthesia and surgery is monitored according to professional practice guidelines and documented in the patient's record.	Anesthesia record documented in the patient's file
Postoperative care	ASC 6.1: Each patient's post anesthesia status is monitored and documented, and the patient is discharged from the recovery area by a qualified individual or by using established criteria.	Postoperative orders documented in the patient's file. Discharge signed by anesthesiologist or according to Aldrete score by a Post Anesthesia Care Unit nurse.

ASC : Anesthesia & Surgical Care ; IPSG : International Patient Safety Guidelines ; ASA : American Society of Anesthesiology.

Data collection

Postoperatively, patient files were screened for the presence of the required documents, corresponding with the JCI standards. Other data included gender, age and ASA classification. All data were collected using Microsoft Access®.

Communication and feedback

Data collection and compliance calculation were performed at the end of each study period. Graphs of compliance were widely posted in the OR (offices, process improvement information boards). Presentations discussing results were held on a monthly base to anesthesiologists, surgeons and head nurses, as to stimulate and improve adherence where possible. Individual performance problems were discussed between the deputy chief medical officer and the health care professional in question.

Feedback was stopped 4 months after the accreditation audit. No process improvements were made until the 1 y follow up study period. Preparing the 2 y follow up study period, compliance data of the 1 y follow up study period and suggested process improvements were communicated to all OR professionals.

Process improvements

Before baseline measurement, a reworked workflow in conformity with requirements was presented to all surgeons, anesthesiologists and OR-nurses (Table 2).

Throughout the study (except for the period between Audit + 4 and 1 y follow-up) this workflow was repeatedly coached and taught to all OR professionals and process improvements were suggested (Table 3).

We used a broad spectrum of channels and methods to communicate with patients and all staff involved, making sure every professional knew what requirements were to be met on the patient's trajectory through the perioperative period. We also

Table 2

Actions before baseline measurement

Process improvements	Actions
Development of an Anesthesia & Sedation procedure. Standardization of anesthesia & sedation, in accordance with JCI standards for anesthesia.	Communication of the new procedure to anesthesiologists, surgeons and OR nurses
Standardization of preoperative flow	Involving the admission department in steering pre-operative flow: Providing preoperative documentation and, information of the required pre-anesthesia assessment (physical and additional technical examinations, by a GP or an anesthesiologist) Contacting all planned admissions (outpatients and inpatients) 24h before admission to remind them of instructions regarding pre-anesthesia assessment, informed consent and pre-operative preparation Involving surgeons in pre-operative information requirements: distribution of information flyers and pre-anesthesia assessment documents
Standardization of informed consent requirements	Defining requirements, in accordance with JCI standards Communication of requirements to anesthesiologists and surgeons
Development of a modified WHO Safe Surgery Checklist	Communication of the checklist to surgeons, anesthesiologists, and operating room nurses Training in correct use of the SSC

rolled out clear instructions on a communication strategy both towards the patient as among staff involved in case necessary documents or information were not available for a patient pre-operatively.

The set of documents we used was designed not only to make sure requirements could be fully met (as mentioned above), but also to assure that in case of any doubt or uncertainty, the patient would be referred to the anesthesiology department for help or clarification. Emphasizing the importance of safe surgery checklist use and a hard time out stop before incision sometimes required personalized feedback to individuals (surgeons, OR nurses and anesthesiologists alike) failing to cooperate.

Reintroduction of measures following the 1 y follow-up period consisted mainly of repetition of these requirements towards the staff involved. Surgeons were requested to renew efforts to pursue optimal preoperative communication towards their patients, while also making sure the patient received all required documents, so pre-anesthesia assessment and informed consent could be obtained. Anesthesiologists were requested to perform last-minute pre-anesthesia assessment if there was none available, reminded to countersign informed consent files (as per procedure), and asked to adhere to the agreed-upon workflow.

Statistical analysis

Compliance with the standards was calculated. The zero hypothesis was that there was no difference in compliance during the different study periods, the alternative hypothesis was a difference in compliance. We used Chi-square, Fisher Exact and ANOVA tests (XL-Stat, Addinsoft©), where appropriate. The Cochran-Armitage trend test (XL-Stat, Addinsoft©) was used for statistical analysis during the pre-accreditation and post-accreditation study periods, since this test has higher power than the Chi-square test when a suspected trend could be correct (6,7). Results with $p < 0.05$ were considered statistically significant.

Results

Study population (Table 4)

5729 patients were screened for inclusion. 3597 patients were included : 450 during the baseline measurement, 1412 in the pre-audit study period, 1129 in the post-audit study period, 275 in the 1 y follow up study period, and 331 in the 2 y follow up study period. There were no statistically significant differences regarding gender and ASA-score. Mean age showed a statistically significant difference for the 2 y follow up study period ($p < 0.01$), which we can attribute to certain surgical disciplines being less or more active due to vacation or absence of surgeons. We did not consider this to be relevant towards the results of our measurements.

Obtaining optimal compliance in the pre-audit study period (Fig. 1)

Statistically significant improvement in compliance was observed in pre-anesthesia assessment ($p < 0.0001$), informed consent ($p < 0.0001$), anesthesia record keeping ($p < 0.0001$) and correct postoperative care ($p < 0.0001$).

No significant improvement was observed in pre-induction assessment ($p = 0.13$) and safe

Table 3

Process improvements

Pre-Anesthesia Assessment (PAA)	**Major Findings**	**Process Improvements**
Pre- & post-audit study periods	Surgeons: variability in handing over pre-operative documents (including PAA documents) to patients	Motivate surgeons to ask patients to contact the admission department Motivate surgeons to instruct patients in obtaining the PAA Develop instruction card for patients to contact the admission department
	Nurses of outpatient OR: patients without PAA pass to OR without further interventions	Nurses contact the anesthesiologist Nurses ask patients to fill out pre-anesthesia questionnaire
	Nurses of hospital wards: inpatients pass to OR without fulfilling pre-anesthesia requirements	Nurses contact the anesthesiologist Nurses ask patients to fill out pre-anesthesia questionnaire
	Anesthesiologists: patients without PAA pass to OR without further evaluation, leading to last minute postponing of surgery	Anesthesiologist performs ultimate PAA, preferentially before the patients passes to OR
1 year follow up study period		None
2 year follow up study period	Surgeons: more variability in handing over pre-operative documents; less communication to patients about the required pre-anesthesia assessment.	Coaching & teaching of the requirements
Informed Consent (IC)	**Major Findings**	**Process Improvements**
Pre- & post-audit study periods	Surgeon: variability in handing over pre-operative documents (including informed consent documents) to patients scheduled for surgery just in time (leaving no time to send the documents by post)	Motivate surgeons to ask patients to contact the admission department Develop instruction card for patients to contact the admission department Informing patients that the admission department will provide preoperative documents
	OR & hospital ward nurses: Patients arrive in the pre-operative waiting zone without signed IC	Patients are motivated to give IC by the OR & hospital ward nurses
	Anesthesiologists forget to sign IC	Motivate anesthesiologists to sign IC
1 year follow up study period		None
2 year follow up study period	Surgeons: more variability in handing over pre-operative documents	Coaching & teaching of the requirements
	Patients do not sign IC	Motivate OR nurses to check presence of IC & to motivate patients to give IC Motivate patients to give IC
	Anesthesiologists do not sign IC	Motivate anesthesiologists to follow guidelines on IC
Pre-Induction Assessment (PIA)	**Major Findings**	**Process Improvements**
Pre- & post-audit study periods	Anesthesiologists do not document all PIA requirements (time of assessment, blood pressure, heart rate and rhythm, SpO_2)	Motivate anesthesiologists to document all required items of PIA
1 year follow up study period		None
2 year follow up study period	None	Coaching & teaching of the requirements
Safe Surgery Checklist (SSC)	**Major Findings**	**Process Improvements**
Pre- & post-audit study periods	Surgeons: lack of sense of urgency to comply, unwillingness to implement the SSC	Communication of individual results to surgeons that fail to cooperate
	Anesthesiologists: fail to perform sign in part of SSC, mostly due to lack of sense of urgency to comply and unwillingness to confront surgeons and OR nurses	Motivate anesthesiologists to perform sign in & to participate in hard stop Time Out moment
	OR nurses: fail to perform the hard stop Time Out moment, mostly due to fear of disapproval by physicians, partly due to unwillingness to comply	Motivate and reinforce OR nurses to perform the hard stop Time Out moment Motivate anesthesiologists to stimulate OR nurses to perform the hard stop Time Out moment Motivate surgeons to stimulate OR nurses to perform the hard stop moment Independent observations of compliance Integration of compliance with standard in the individual performance evaluation of every nurse
1 year follow up study period		None
2 year follow up study period	None	Coaching & teaching of the requirement
Anesthesia Record Keeping (ARK)	**Major Findings**	**Process Improvements**
Pre- & post-audit study periods	None	Coaching & teaching of the requirements
1 year follow up study period		None
2 year follow up study period	None	Coaching & teaching of the requirements
Correct Postoperative Care (CPC)	**Major Findings**	**Process Improvements**
Pre- & post-audit study periods	None	Coaching & teaching of the requirements (complete postoperative order, ensuring adequate postoperative monitoring, safe discharge in correct postoperative status)
1 year follow up study period		None
2 year follow up study period	None	Coaching & teaching of the requirements

Table 4

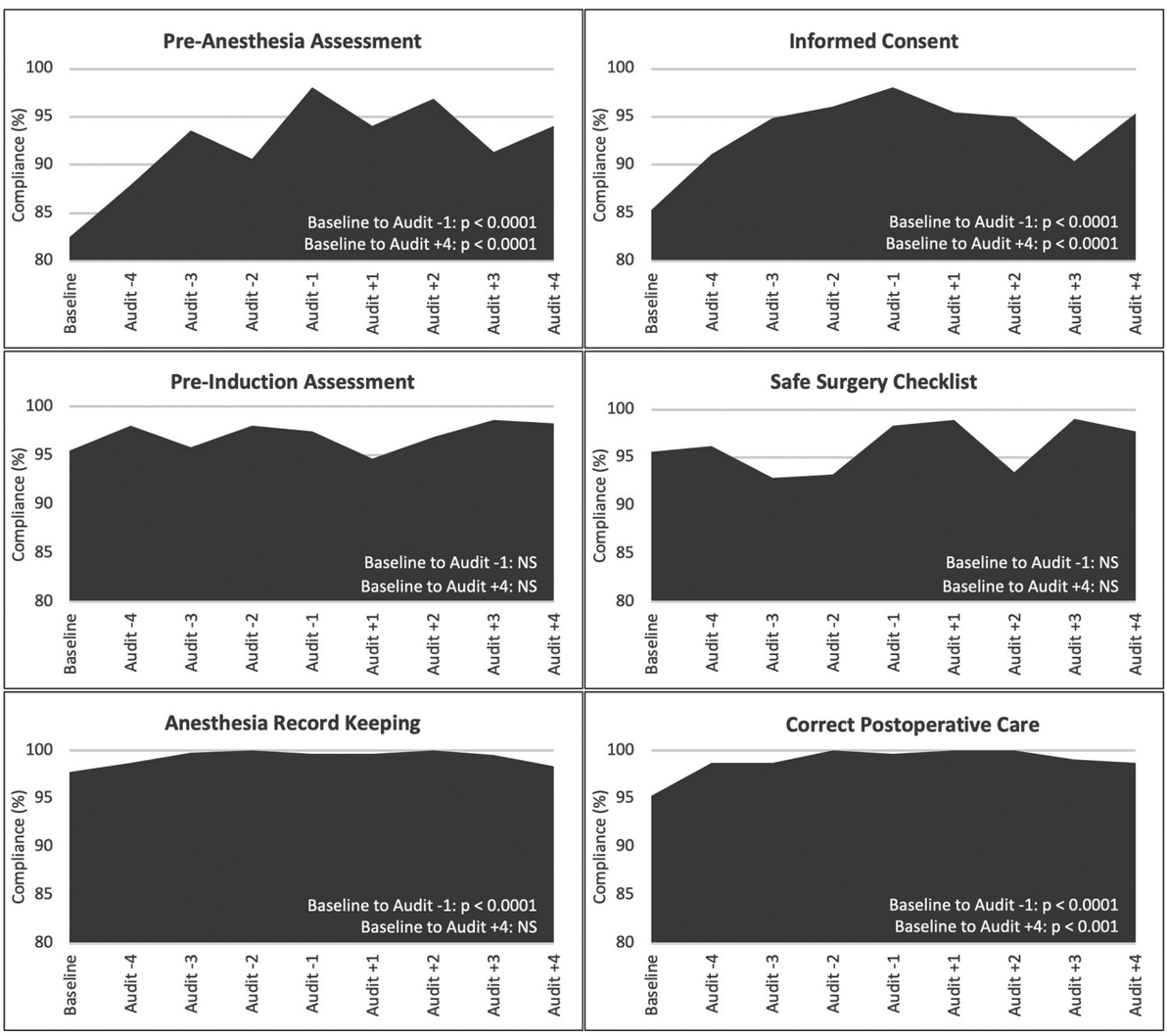
Study population

	Baseline (n = 450)	**Pre audit** (n = 1412)	**Post audit** (n = 1129)	**1 year follow up** (n = 275)	**2 year follow up** (n = 331)	
Age: Mean (SD)	47.75 (21.58)	45.55 (22.50)	46.57 (23.79)	44.48 (24.48)	50.94 (22.10)	P < 0.01
Gender: Male / Female	195 / 255	756 / 843	535 / 594	298 / 284	168 / 163	P > 0.5
ASA score:						P > 0,5
ASA 1	99	525	442	247	105	
ASA 2	122	720	557	262	191	
ASA 3	19	166	128	65	34	
ASA 4	0	1	2	0	1	

surgery checklist use (p = 0.52), despite multiple interventions.

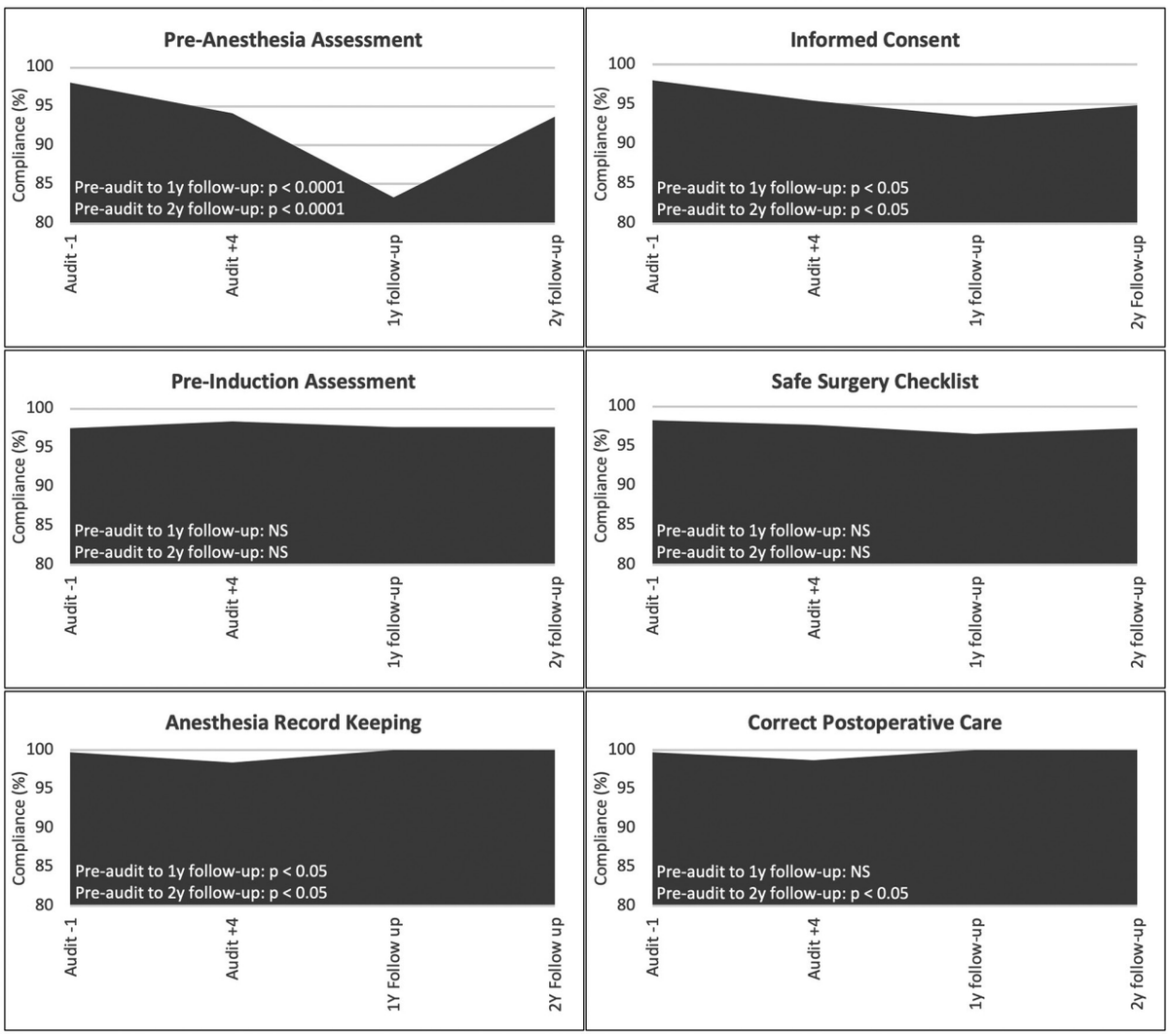
Avoiding a decrease in compliance in the post-audit study period (Fig. 1)

Compliance continued to improve significantly for pre-anesthesia assessment (p < 0.0001) and correct postoperative care (p < 0.001). Compliance with informed consent, on the other hand, decreased significantly (p < 0.0001). There was no significant



Cochran-Armitage Trend Test. Statistical significance: p < 0.05. Audit –4: 4 months before the accreditation audit, etc. NS: not significant.

Figure 1.



Chi-square and Fisher Exact tests. Statistical significance: $p < 0.05$. Audit –1: 1 month before the accreditation audit, etc. NS: not significant.

Figure 2.

difference for pre-induction assessment ($p = 0.1$), safe surgery checklist ($p = 0.07$) and anesthesia record keeping ($p = 0.08$).

Evolution during the 1y follow up study period (Fig. 2)

After ceasing all interventions 4 months post-audit, improvement was not maintained for pre-anesthesia assessment ($p < 0.0001$) and informed consent ($p < 0.05$). On the other hand, compliance continued to improve for anesthesia record keeping ($p < 0.05$). It has to be stated that this improvement was hardly of clinical importance. Improvement was maintained for pre-induction assessment ($p = 0.66$), safe surgery checklist ($p = 0.20$) and correct postoperative care ($p = 0.07$).

Evolution during the 2y follow up study period (Fig. 2)

Coaching and teaching after a new compliance measurement resulted in improvement of pre-anesthesia assessment ($p < 0.0001$) and informed consent ($p < 0.05$). Compliance was maintained for pre-induction assessment ($p = 0.87$) and safe surgery checklist ($p = 0.34$). Since compliance was 100% with anesthesia record keeping and correct postoperative care in both 1 y and 2 y follow-up study periods, a statistical but clinically insignificant difference was obtained (both $p < 0.05$).

Discussion

About obtaining optimal compliance

Highly reliable performance is necessary during the perioperative period. Anesthesia work is non-routine and very complex, with an important risk of unintended or unanticipated complications (8). JCI highlights this need, by creating a separate chapter for it in its standards. In preparation for the accreditation audit, peri-anesthetic workflow had to be streamlined and standardized in order to comply with JCI requirements. Health care professionals involved in the perioperative process were familiarized with these procedures and motivated to comply. Baseline measurement revealed poor observance of new procedural workflow shortly after introduction, especially concerning adequate execution of the pre-anesthesia assessment and obtaining informed consent. In this study we were able to demonstrate a tremendous potential for improvement, achieved by actively supporting professionals involved in the perioperative process. As already shown by McCahill et al. (9) and Kingston et al. (10), multimodal process improvements involving various and intensive ways of communication can help to enhance performance, by involving other health care professionals, motivating both patients and healthcare professionals and providing individual performance feedback.

At the end of the pre-audit study period, decent to optimal compliance was achieved with almost all JCI standards. Naturally, announcing the study, communicating interval results and performing it immediately prior to accreditation audit probably created a Hawthorne type effect and enticed health care professionals to meet standards faster.

The only standard where compliance fell short, was the anesthesiologists' participation in the safe surgery checklist. Although overall compliance was > 90%, this International Patient Safety Goal seeks 100% compliance. As reported before (11), individual failure to comply remained present, despite several interventions. Earlier published work by O'Connor et al. (12), suggests the inability to convince health care professionals thoroughly of the benefits of complying with this standard could be responsible for the gap. Other barriers against effective compliance could be lack of teamwork, bad timing of performing the time out hard stop of the safe surgery checklist and intimidation by senior staff (both anesthesiologists and surgeons). As stated by Sendlhofer et al. (13), the gap between individual perception of the benefit of the SCC and effective compliance continues to be the most important barrier against improvement.

An interesting point of view was recently developed by Porter (14), stating that individual performers are poorly motivated by process indicators. Most indicators are unable to differentiate among health care providers, resulting in limited incentives for improvement. Measuring adherence to requirements requires a vast amount of effort, time and resources. Clinicians are therefore tempted to be skeptical about the value of high performance in fulfillment of these requirements. In our hospital, we encountered this skepticism and sometimes had to argue strongly about the need to comply. Another important question is whether measuring compliance with these standards creates additional value for the patient, especially when compliance already is very high at the start. It seems reasonable to invest time and money to raise compliance from very low levels to above 90%, but higher compliance levels rarely matter for outcome (15). Furthermore, repeatedly measuring compliance and attempting to increase figures above 90% comes at an exponentionally growing investment, raising the question whether continued investment is warranted when held against marginal or absent outcome improvement.

About observing a post-audit drop in compliance

To see if improvement was sustained, the study was continued during the first 4 months after the audit. As demonstrated earlier, compliance tends to drop once the audit has ended (16, 17). Indeed, compliance often automatically reverts to baseline values, especially once compliance monitoring ends, unless process monitoring and optimization, education and feedback are continued. In our study, compliance was maintained or even improved for most standards during the 4 months post-audit. An important contributing factor, undoubtedly, was the continued posting of new results during 10 consecutive months both pre- and post-audit, with strong emphasis on working points and individual feedback to reluctant health care professionals. The relief and satisfaction that accompanied obtaining the accreditation label may also have convinced several colleagues to continue adhering to the standards.

However, releasing pressure too soon after the audit (4 months post-audit) resulted in lower compliance for several items 1 year later. Patient and physician participation remains crucial : they

need to fulfill the requirements of preoperative documentation and preparation. Especially young patients previously in good health, undergoing minor surgery, tend not to fulfill the requirements, sometimes even incited by their physicians to not do so. This shows that both professionals and patients continuously need to be stimulated to fulfill requirements. Teaching and communication of new data indeed improved compliance again 2 years post-audit.

One shortcoming of the study might be that we did not investigate other quality and patient safety interventions (e.g. hand desinfection, medication labeling and administration, …). We did not address them in this study for several reasons. First, our analysis of the perioperative process indicated that the selected items were the most important to observe and to optimize. Secondly, certain items (e.g. hand desinfection) have to meet other standards, which must be applied throughout the hospital, and they are therefore not specific to the anesthesia process. In third place, they require a different kind of observation technique, which is subject to important bias and about which there exists a lot of controversy. This may be the subject of future research.

Another shortcoming might be the limitation of the study to the classical operation theatre, hereby excluding interventions under general or regional anesthesia outside the OR (e.g. endoscopy, interventional radiology, …). Although pre-anesthetic requirements are organized and communicated in a similar way, the main reason for exclusion was the difference in organization and patient flow, complicating data collection, data analysis, and consequently introducing bias.

AZ Sint-Blasius has been accredited by JCI. Other Belgian and international hospitals are accredited by other accreditation organizations, such as the Dutch-Canadian NIAZ-Qmentum, Accréditation Canada International, or the French Haute Autorité de Santé. Standards for anesthesia are however quite similar across these organizations. This strengthens our findings and makes them applicable for anesthesia departments in hospitals that have opted for a different accreditation organization.

Conclusion

This study provides a view on how to enhance and maintain compliance with set standards for anesthesia. The streamlining of procedures, communication towards the professionals involved in the perioperative process and close follow-up demonstrate the strong potential of improvement in hospitals aiming to achieve an optimal perioperative flow, while in this study also complying with JCI standards. The damping effect late after stopping the communications shows that it is important to persevere much longer than previously thought, as some markers indicated a declining compliance after ceasing feedback – especially in tasks requiring action during a period in which time pressure is higher (pre-induction). This effect however, was reversible by the reintroduction of encouraging measures, as demonstrated in follow-up 2 years post-audit.

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