Benchmarking of World Health Organization surgical safety checklist

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ABSTRACT

الأهداف: مقارنة قائمة السلامة للإجراء الجراحيّ المطبقة لدينا، بقائمة منظمة الصحّة العالميّة.

الطريقة: تم تحميل قائمة سلامة الأداء الجراحيّ من موقع منظمة الصحّة العالميّة على الشبكة العالمية للمعلومات، وأجريْنا مقارنة بين عناصرها وبين عناصر قائمة سلامة الأداء الجراحيّ المعمول بها في مستشفى القوات المسلحة – وادي الدواسر – المملكة العربية السعودية، وكان هناك أربعة احتمالات لهذه المقارنة: إمّا أن يكون مستوى الأداء لدينا بالمقارنة للبند المذكور في قائمة منظمة الصحة العالميّة مطابقًا، أو أقلّ، أو يفوقه من حيث الأداء، وإمّا أن يكون هناك مستويات إضافيّة آمنة التطبيق في إحدى القائمتين وعلى الجهة الأخرى أخذها بعين الاعتبار.

النتائج: أثبتت دراسة المقارنة والإقتداء بالأفضل أنّه ليس فقط ممارستنا الجراحية الآمنة تتوافق مع القائمة الآمنة للأداء الجراحي الخاصة بمنظمة الصحة العالميّة، بل تفوقها في جوانب آمنة أخرى مثل خطوات منع انخفاض حرارة المريض فترة ما حول الجراحة ومنع حدوث جلطة الوريد.

خاتمة: المقارنة والإقتداء بالأفضل عمليّة مستمرّة لتحسين الجودة، وتهدف إلى تقديم الأحسن في الرعاية الصحيّة، وعلى الرغم من أنه لم يقصد لها أن تكون شاملة، فإنّ قائمة الأداء الجراحيّ الآمن لمنظمة الصحة العالميّة خطوة جسورة في الاتجاه الصحيح نحو جراحة محمودة العواقب. ولابدّ أن يكون هناك تجاوب من المراكز الطبيّة لجلب المزيد من الممارسات الآمنة لإضافتها مستقبلاً إلى قائمة منظمة الصحة العالميّة.

Objective: To compare the quality of our services with the World Health Organization (WHO) surgical safety recommendations as a reference, to improve our services if they fall short of that of the WHO, and to publish our additional standards, so that they may be included in future revision of WHO checklist.

Methods: We conducted this study on 15th July 2008 at the Armed Forces Hospital, Wadi Al-Dawasir, Kingdom of Saudi Arabia. We compared each WHO safety standard item with its corresponding standard in our checklist. There were 4 possibilities for the comparison: that our performance meet, was less than or exceeded the quality-of-care measures in the WHO checklist, or that there are additional safety measures in either checklist that need to be considered by each party.

Results: Since its introduction in 1997, our checklist was applied to 11828 patients and resulted in error-free outcomes. Benchmarking proved that our surgical safety performance does not only match the standards of the WHO surgical safety checklist, but also exceeds it in other safety areas (for example measures to prevent perioperative hypothermia and venous thromboembolism).

Conclusions: Benchmarking is a continuous quality improvement process aimed at providing the best available at the time in healthcare, and we recommend its adoption by healthcare providers. The WHO surgical safety checklist is a bold step in the right direction towards safer surgical outcomes. Feedback from other medical establishments should be encouraged.

Since the publication of the report "To Err is Human" in 1999[1] the pursuit of improved patient safety has assumed a prominent global role in the healthcare system, albeit progress has been slow.[2,3] It is expected that the impact of surgical intervention on public

health systems will grow as the incidences of traumatic injuries, cancers, and cardiovascular disease continues to rise. On the 25th June 2008, the World Health Organization (WHO) released a new safety checklist for surgical teams to use in operating rooms under the theme "Safe Surgery Saves Lives" to improve the surgical safety worldwide. This has been published in leading medical journals and on the Internet,[4,5] and was widely covered by the media. The WHO initiative aims at reducing avoidable surgical procedures' morbidity and mortality. It provides a set of surgical safety standards applicable to all countries and health settings. Our surgical safety checklist at the Armed Forces Hospital, Wadi Al-Dawasir, Kingdom of Saudi Arabia was in operation more than a decade ago, achieving its target of 100% error-free. We benchmarked our checklist with that of the WHO and we believe that this is the first of its kind. The aim of this study is to compare the quality of our services with the WHO surgical safety recommendations as a reference, to improve our services if they fall short of that of the WHO, and to publish our additional standards, so that they may be included in future revision of WHO checklist.

Methods. The study was conducted on 15th July 2008 at Armed Forces Hospital, Wadi Al-Dawasir, Kingdom of Saudi Arabia, after downloading the Surgical Safety Checklist from the WHO website.[5] Ethics approval was not needed. The checklist covers 3 phases each corresponding to a specific time period in the normal flow of a surgical procedure: before induction of anesthesia: "Sign In," before skin incision: "Time Out," and before the patient leaves the operating room: "Sign Out." We planned to benchmark each phase separately. Each component of each phase of the WHO checklist will be compared with our practice here at our Hospital. For every component there are 4 possibilities: 1) the recommended standard is applied and practiced in our Hospital, 2) the recommended standard is not applied or practiced in our Hospital, 3) our practice falls short of the recommended standard, or 4) either checklist contains additional surgical safety standards.

Results. From the time of its introduction in September 1997 until end of May 2008, our safety surgical checklist has been applied to 11828 elective surgical cases. These cases were divided as follows: General surgery: 3055 (25.8%), ENT: 2211 (18.7%), Obstetrics: 2152 (18.2%), Orthopedics: 1892 (16%), Urology: 1195 (10.1%), Gynecology: 591 (5%), Dental & Maxillofacial: 414 (3.5%), Ophthalmology 165 (1.4%), and Neurosurgery 153 (1.3%). There were no reported surgical errors. Components of the WHO's

surgical safety checklist followed by the practice in our hospital are shown in **Table 1**.

Discussion. Benchmarking is an improvement tool whereby an establishment measures its performance or process against other organizations' best practices, determines how those establishments achieved their performance levels, and uses the information to improve its own performance. It is a continuous process of comparison between the same activity performed by a competitor to identify the best practice and to learn how to lower costs, reduce defects, increase quality, or improve outcomes linked to organization excellence.[11] Due to its importance in total quality management systems some healthcare providers established benchmarking as separate units, for example, the United Kingdom National Health Service Benchmarking Network, founded in 1996.

Worldwide, nearly 234 million major surgical procedures are performed every year, or one for every 25 people. Evidence to date suggests that a significant percentage of these cases are associated with preventable complications and even with death. In developed countries, the rate of major complications ranges from 3-16%, and rates of permanent disability or death range from 0.4-0.8%. In the developing world, death rates for major surgery may reach 5-10%, with mortality from general anesthesia approaching one in 150 in parts of Africa, approximately half of these complications may be preventable.[12] The WHO advise that its Surgical Safety Checklist is not intended to be comprehensive and it encourages additions and modifications to fit local practice.

This study is the first of its kind. By benchmarking the surgical safety steps and practices taken in our Hospital against the WHO Surgical Safety Checklist, we conclude that all components of the WHO Checklist (with minimal variations to adapt the nature of our establishment) match our surgical safety measures as determined in the policy and procedures (PPGs) implemented in our hospital. Not only this, but also that our surgical safety steps are advanced in some indispensable aspects of the field of surgical safety, like our advanced measures to prevent the occurrence of inadvertent hypothermia in the surgical patient,[13] (including warm mattress, the use of fluid/blood warmer and the application of forced-air surface warming) and in the prophylaxis against the development of venous thromboembolism in the perioperative period (in the form of administration of low-molecular weight heparin "LMWH", provision of graduated anti-embolic leg stockings, intraoperative application of sequential pneumatic compression to the lower limbs, and early postoperative mobilization). For their proven favorable

Table 1 - Components of the WHO's surgical safety checklist followed by the practice in our hospital.

WHO's surgical safety checklist	Our hospital practice
First phase: "Sign In"	
1) Patient has confirmed: identity, site, procedure, and consent.	Before attaching the wristband to the patient, 2 nurses check with the patient or a guardian, his identity, site, procedure, and consent. It is a general understanding among anesthetists and operating room personnel that once the patient has been premedicated (either by a narcotic or by an anxiolytic) the patient may not be able to give accurate information due to the effect of such drugs on his cognitive functions. On arrival at the reception of the operating room (OR), endorsement of the patient takes place between the ward nurse and OR nurse. Unless there is confusion on items on this component of the checklist, the patient is not asked to confirm any of it.
2) Site marked/not applicable.	If there is laterality (a right or left distinction) or 2 or more structures, usually the site is marked by the surgeon using permanent felt-tip marker.
3) Anesthesia safety check completed.	The built-in checking system in our modern anesthetic delivery units prevents their use before they are checked, and we follow known international recommendations[6,7] in relation to daily checking of equipment, besides regular maintenance. All fluids and drugs used during anesthesia are checked before drawing them in syringes regarding formula, concentration, dose, expiry date, clarity, and indications. All syringes are labeled. If drugs are administered at different times of the surgery, only those used at one time are present in the drug tray.
4) Pulse oximetry on patient and functioning.	Before induction of anesthesia, the patient is connected to the basic monitors for O_2 saturation, blood pressure and electrocardiogram (ECG). Female patients are informed well before elective procedures not to apply henna on their fingers to avoid inaccuracies in monitoring oxygen saturation.[8] In addition, measures (what measures) to prevent development of hypothermia and venous thromboembolism are taken before induction of anesthesia.
5) Does patient have a known allergy?	The patient is asked of any known allergies and this is documented in his records.
6) Difficult airway/aspiration risk?	During the preoperative visit, the anesthetist assesses the patient's airway using a bedside evaluation score tests (Mallampati Test[9] and Upper Lip Bite Test[10]). Preparations for difficult intubation and alternative ways to secure the airway, including the possibility of regurgitation, are taken by the anesthetist before induction of anesthesia.
7) Risk of >500 ml blood loss (7 ml/kg in children)?	All patients have access to a vein prior to induction of anesthesia. The blood bank keeps enough units of type O negative in case of emergency and clinicians have a hospital laboratory guide booklet containing the number of cross matched units of blood to be ordered for each type of surgery, if any.
Second Phase: "Time Out"	
1) Confirm all team members have introduced themselves by name and role.	All those involved in the surgical management of the patient are well known to each other.
2) Surgeon, anesthesia professional, and nurse verbally confirm: patient, site and procedure.	Before the patient enters the operating room, the surgeons check all the details and sign the preoperative checklist. Anesthetists do not start induction until surgeons show up and speak with the patient and verbally confirm details and the procedure.
3) Anticipated critical events:	
Surgeons reviews: what are the critical or unexpected steps, operative duration, anticipated blood loss?	Prior to induction of anesthesia, the operative team, including the anesthetist, discuss possible anticipated critical or unexpected events and the readiness of the whole team to deal with it.
Anesthesia team reviews: Are there any patient-specific concerns?	Steps have been taken to deal with any concerns.
Nursing team reviews: Has sterility (including indicator results) been confirmed? Are there equipment issues or any concern?	Before unpacking surgical instruments, the nursing team has already reviewed its sterility, and any concern over equipment is usually reported to the surgeon the day before the operation in elective cases. Any other new issue is immediately reported to the concerned party (surgeon or anesthetist).
Has antibiotic prophylaxis been given within the last 60 minutes?	Prophylactic antibiotic is given at the time of induction of anesthesia to coincide with skin incision when the antibiotic plasma concentration is at its peak.
Is essential imaging displayed?	In each operating room there are 2 x-ray viewing boxes positioned to face the surgeon on which patient's radiological films are displayed. If it is applicable, a radiographer is present from the start with the necessary imaging equipment.
Third phase "Sign Out"	
1. Nurse verbally confirms with the team	
The name of the procedure recorded	At the end of the surgical procedure, the circulating nurse completes the perioperative nursing record, which includes space for the operation performed by the surgeon, who then writes the operative notes in a separate form with the name and details of the operation.
That instrument, sponge and needle count are correct (or not applicable)	The scrub and circulating nurses count the instruments, sponges, and needles twice: a preliminary count followed by a final count. The count is communicated to the surgeon loudly and documented in the perioperative nursing record.
How the specimen is labelled (including patient name)	Specimens are collected and labelled properly. The surgeon writes the details of the specimen on a special form and sent to be sent the laboratory.
Whether there are any equipment problems to be addressed	Any problems with equipment are relayed to the biomedical engineers, and the surgeon is informed.
2. Surgeon, anesthesia professional and nurse review the key concerns for recovery and management of the patient	The anesthetist personally escorts the patient to the recovery area with the patient's O_2 saturation displayed during transport. In the recovery area, the patient is connected to the vital signs monitors and the anesthetist makes sure that the condition of the patient is stable before he starts the next case. The anesthetist informs the recovery nurse of his whereabouts in case the need arises. The recovery area is provided with resuscitative equipment and drugs in the event of a possible emergency. If applicable, the surgeon instructs the recovery room nurse to observe and report the changes related to surgery (for example excessive bleeding from the wound or in the drain, or change in urine color).

outcomes, we propose that these additional safety measures to be considered by the WHO in any future revision of the surgical safety checklist.

Limitations of this study include possible Hawthorne effect and the restriction of the data collected to elective surgical cases. To boost the cause of patient safety and to introduce an element of competition among medical centres worldwide it may be suggested that hospitals with a good safety record be recognized by the WHO as centers of excellence in surgical patient's safety. This can be achieved by complying with contents of either filling a form or questionnaire, or by a visit from a committee from a regional WHO branch.

The WHO's safe surgery checklist presents operating room staff with a tangible instrument to promote safety. However, the checklist is not an end in itself. Its real value lies in encouraging communication among teams, and stimulating further reform to bring a culture of safety to the very center of patients' care, and can be taken as a model to imitate and implement in other areas of patient's management.

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