# Хирургическая безопасность

«Я хочу написать не простую статью, не изложение некоторых интересных историй болезни, но осуществить выполнение своих излюбленных размышлений, путем правдивого, открытого признания в своих ошибках и посредством раскрытия запутанного механизма их избавить своих учеников и начинающих врачей от повторения их».

Н.И. Пирогов.

Ежегодно в мире выполняется 234 миллиона обширных оперативных вмешательств – по одному на каждые 25 человек.

63 миллиона человек подвергаются операциям в связи с полученными травмами, 10 миллионов — из-за осложнений, связанных с беременностью, и 31 миллион — для лечения раковых заболеваний.

У 3-25% госпитализированных пациентов послеоперационные осложнения приводят к инвалидности или длительному пребыванию в больнице, смертность после обширных хирургических вмешательств составляет от 0,4 до 10%, в зависимости от сложности операции и условий медицинского учреждения.

Качественные показатели хирургических вмешательств остаются малоизвестными в мире, достоверно судить о после операционной смертности можно только для 29 стран.

4,2 млн. человек во всем мире умирают в течение 30 дней после операций ежегодно и половина этих смертей происходит в странах с низким и средним уровнем дохода. Это число послеоперационных смертей составляет 7,2% всех смертей в мире или третьей причиной смертности после ишемической болезни сердца (17,3 %) и инсульта – 10,1%. Ежегодно в течение 30 дней после операций умирают больше людей, чем от всех причин, связанных с ВИЧ, малярией, туберкулёзом вместе взятых (2,97 млн. случаев). Расширение хирургических вмешательств приведёт к увеличению общей смертности в мире до 6,1 млн. в год.

Несмотря на определённое повышение осведомлённости медицинских и фармацевтических работников о значительном риске медицинских вмешательств, добиться существенного сокращения медицинских ошибок не удается.

Во многих случаях мы могли бы улучшить результаты лечения путем повышения качества и безопасности, нежели путем разработки новых методов лечения.

# ПРОЕКТ ВОЗ - БЕЗОПАСНАЯ ХИРУРГИЯ СПАСАЕТ ЖИЗНИ

Целью кампании "Безопасная хирургия спасает жизни" является улучшение безопасности хирургической помощи в мире путем обеспечения соблюдения признанных стандартов медицинской помощи во всех странах.

Благодаря Контрольному перечню ВОЗ по обеспечению хирургической безопасности улучшено соответствие стандартам и уменьшено число осложнений в результате хирургических операций в пилотных больницах, где проводилась оценка данного проекта.

Перечень состоит из контрольного перечня мер, который обеспечивает безопасность пациента в операционной.

Разработан таким образом, чтобы быть простым и кратким. Занимаемое время заполнения контрольного перечня - три минуты (по одной минуте на каждый этап). На каждом этапе планируется от пяти до девяти вопросов, которые направлены на чёткие действия.

# Контрольный перечень мер по обеспечению хирургическойх безопасности

Всемирная организация здравоохранения

Безопасность пациентов
Всемирный альянс за более безопасную медицинскую помощь

## До начала анестезии

(в присутствии, как минимум, медсестры и анестезиолога)

**Подтвердил ли пациент свое имя, место операции, процедуру и согласие?**
- ☐ Да

**Маркировано ли место операции?**
- ☐ Да
- ☐ Не применимо

**Проведена ли проверка оборудования и лекарственных средств для анестезии?**
- ☐ Да

**Пульсоксиметр зафиксирован на пациенте и функционирует?**
- ☐ Да

**Имеется ли у пациента:**

**Известная аллергия?**
- ☐ Нет
- ☐ Да

**Проблемы дыхательных путей или риск аспирации?**
- ☐ Нет
- ☐ Да, и имеется оборудование/необходимая помощь

**Риск кровопотери >500мл (7мл/кг у детей)?**
- ☐ Нет
- ☐ Да, предусмотрены два устройства для ВВ / центрального доступа и жидкости для вливания

## До рассечения кожи

(в присутствии медсестры, анестезиолога и хирурга)

- ☐ **Подтвердите, что все члены бригады представились по имени и назвали свою роль.**
- ☐ **Подтвердите имя пациента, процедуру и место, где будет проведено рассечение.**

**Проводилась ли антибиотикопрофилактика за последние 60 минут?**
- ☐ Да
- ☐ Не применимо

**Ожидаемые критические события**

**С точки зрения хирурга:**
- ☐ Критические или неожиданные меры?
- ☐ Длительность операции?
- ☐ Ожидаемая кровопотеря?

**С точки зрения анестезиолога:**
- ☐ Специфичные для данного пациента проблемы?

**С точки зрения операционных сестер:**
- ☐ Стерильность (включая показания приборов) подтверждена?
- ☐ Проблемы с оборудованием или иные вопросы?

**Визуализация необходимых изображений обеспечена?**
- ☐ Да
- ☐ Не применимо

## До того, как пациент покинет операционную

(в присутствии медсестры, анестезиолога и хирурга)

**Медсестра устно подтверждает:**
- ☐ Наименование процедуры
- ☐ Подсчет количества инструментов, тампонов и игл завершен
- ☐ Образцы маркированы (зачитывает надписи на образцах, включая имя пациента)
- ☐ Имеются ли проблемы с оборудованием, требующие устранения

**Хирург, анестезиолог и медсестра:**
- ☐ Каковы основные проблемы, касающиеся реабилитации и ведения данного пациента?

## До начала анестезии

(в присутствии, как минимум, медсестры и анестезиолога)

**Подтвердил ли пациент свое имя, место операции, процедуру и согласие?**

- ☐ Да

**Маркировано ли место операции?**

- ☐ Да
- ☐ Не применимо

**Проведена ли проверка оборудования и лекарственных средств для анестезии?**

- ☐ Да

**Пульсоксиметр зафиксирован на пациенте и функционирует?**

- ☐ Да

**Имеется ли у пациента:**

**Известная аллергия?**

- ☐ Нет
- ☐ Да

**Проблемы дыхательных путей или риск аспирации?**

- ☐ Нет
- ☐ Да, и имеется оборудование/необходимая помощь

**Риск кровопотери >500мл (7мл/кг у детей)?**

- ☐ Нет
- ☐ Да, предусмотрены два устройства для ВВ / центрального доступа и жидкости для вливания

# Первый этап – «Прибытие» (до введения анестезии)

(дополнено информацией о проведении профилактики тромбоэмболических осложнений)

**До рассечения кожи**

(в присутствии медсестры, анестезиолога и хирурга)

- ☐ **Подтвердите, что все члены бригады представились по имени и назвали свою роль.**
- ☐ **Подтвердите имя пациента, процедуру и место, где будет проведено рассечение.**

**Проводилась ли антибиотикопрофилактика за последние 60 минут?**

- ☐ Да
- ☐ Не применимо

**Ожидаемые критические события**

**С точки зрения хирурга:**

- ☐ Критические или неожиданные меры?
- ☐ Длительность операции?
- ☐ Ожидаемая кровопотеря?

**С точки зрения анестезиолога:**

- ☐ Специфичные для данного пациента проблемы?

**С точки зрения операционных сестер:**

- ☐ Стерильность (включая показания приборов) подтверждена?
- ☐ Проблемы с оборудованием или иные вопросы?

**Визуализация необходимых изображений обеспечена?**

- ☐ Да
- ☐ Не применимо

# Второй этап – "Тайм-аут" (до кожного разреза)

(добавлен пункт
о температуре
больного и
в операционной (21-24 С)

**До того, как пациент покинет операционную**

(в присутствии медсестры, анестезиолога и хирурга)

**Медсестра устно подтверждает:**

- ☐ Наименование процедуры
- ☐ Подсчет количества инструментов, тампонов и игл завершен
- ☐ Образцы маркированы (зачитывает надписи на образцах, включая имя пациента)
- ☐ Имеются ли проблемы с оборудованием, требующие устранения

**Хирург, анестезиолог и медсестра:**

- ☐ Каковы основные проблемы, касающиеся реабилитации и ведения данного пациента?

# Третий этап – «Выход» (до покидания пациентом операционной)

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PLOS ONE

# Implementation of the Surgical Safety Checklist in Switzerland and Perceptions of Its Benefits: Cross-Sectional Survey

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## Abstract

***Objectives:*** To examine the implementation of the Surgical Safety Checklist (SSC) among surgeons and anaesthetists working in Swiss hospitals and clinics and their perceptions of the SSC.

***Methods:*** Cross-sectional survey at the 97th Annual Meeting of the Swiss Society of Surgery, Switzerland, 2010. Opinions of the SSC were assessed with a 6-item questionnaire.

***Results:*** 152 respondents answered the questionnaire (participation rate 35.1%). 64.7% respondents acknowledged having a checklist in their hospital or their clinic. Median implementation year was 2009. More than 8 out of 10 respondents reported their team applied the Sign In and the Time Out very often or quasi systematically, whereas almost half of respondents acknowledged the Sign Out was applied never or rarely. The majority of respondents agreed that the checklist improves safety and team communication, and helps to develop a safety culture. However, they were less supportive about the opinion that the checklist facilitates teamwork and eliminates social hierarchy between caregivers.

***Conclusions:*** This survey indicates that the SSC has been largely implemented in many Swiss hospitals and clinics. Both surgeons and anaesthetists perceived the SSC as a valuable tool in improving intraoperative patient safety and communication among health care professionals, with lesser importance in facilitating teamwork (and eliminating hierarchical categories).

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## Introduction

In Switzerland, over 1 million operations are carried out annually and major complications are expected to occur in 3 to 20% of patients with a mortality rate between 0.8 and 1.5% [1]. Although surgical procedures are performed to save lives and to improve patient's quality of life, unsafe practice and medical errors have also been incriminated in causing serious complications. Such preventable complications have been estimated to increase the total hospital cost by an average 10% [2].

With the increasing burden of patients' comorbidities [3–6], the complexity of the surgical operation and application of advanced technologies, the achievement and maintenance of clinical excellence has become increasingly challenging. Many lessons have been learned from the aviation industry where checklists and training in crew resource management have largely contributed to decrease the incidence of accidents and strengthen safety culture [7–9].

In 2007, the World Health Organization (WHO) initiated the Safer Surgery Saves Lives project [10], in which standards for the safe delivery of surgical care and a 19-item Surgical Safety Checklist (SSC) were developed [11]. This SSC encompasses the three phases of any operation that mirror the take-off cruise and landing phases of the aviation-industry. Before anaesthesia induction ("sign in"), the team confirms patient identity, surgical site, anaesthetic concerns, allergies and estimated surgical blood losses. Before skin incision ("time out"), the entire team is introduced, the anticipated critical events are reviewed, sterility and antibiotic administration is confirmed, and, imaging and other diagnostic elements are displayed if appropriate. Before the patient leaves the operating room (OR) ("sign out"), the swab count is confirmed, procedure name and handling of specific tissue/fluid specimen is confirmed and, equipment, postoperative treatment



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# A mixed methods study of challenges in the implementation and use of the surgical safety checklist☆

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ABSTRACT

*Background:* The surgical safety checklist is an evidence-based global initiative designed to reduce perioperative morbidity and mortality. However, the expounded benefits of the surgical safety checklist have not been realized in naturalistic settings. This may be related to the *quality* of surgical safety checklists being performed in operating rooms.

*Methods:* In this explanatory, sequential, mixed-methods study, 2 trained observers used a standardized tool to record the compliance and quality of the surgical safety checklist completed during 51 surgeries performed at a pediatric academic hospital. We compared compliance with each phase of the surgical safety checklist, the number of checklist items completed, and professionals initiating the surgical safety checklist across surgical specialties and case urgency levels. Interviews with nurses, anesthesiologists, and surgeons ($n = 18$) were subsequently conducted to explore and contextualize the findings.

*Results:* Hospital-recorded surgical safety checklist compliance (94%, 100%, and 100% on briefing, time out, and debriefing) was higher than the proportion of checklist items completed in matched cases (26%, 59%, and 42%, respectively). Thematic analysis of the interview data suggests this may result from limited staff "buy in," arising from the "top-down" mandated nature of the surgical safety checklist, the perceived lack of benefit in surgical safety checklist completion, and redundancies with other operating room processes. This has led to the surgical safety checklist becoming "an exercise in box ticking" (ie, compliance is recorded without ensuring quality), thereby obfuscating potential safety benefits.

*Conclusion:* These results highlight that compliance data are insufficient for monitoring surgical safety checklist quality. Our study suggests that surgical safety checklist quality may be enhanced through better calibration of the surgical safety checklist with existing procedures and staff expectations through a bottom-up implementation strategy.



## Introduction

The safe surgery checklist (SSC) is a global initiative introduced by the World Health Organization (WHO) in 2009, designed to reduce perioperative morbidity and mortality. The SSC is divided into 3 "moments": briefing, time out, and debriefing. Briefing occurs before induction of anesthesia, time out occurs before the start of the surgical procedure, and debriefing occurs after the procedure is completed. Ideally, during these 3 moments, the entire health care team is engaged in a discussion about the procedure and potential safety concerns to mitigate near misses and avert potential complications.

The landmark global cohort study by Haynes et al.[1] showed a marked reduction in perioperative morbidity and mortality after implementation of the SSC in 8 geographically dispersed hospitals. After this, the SSC was taken up as a standard of care by health ministries around the world. However, despite high levels of hospital-reported compliance with the SSC, recent studies have failed to demonstrate the expected reduction in surgical morbidity or mortality after implementation of the checklist.[2–6]

A potential explanation for these discrepant findings is that some surgical teams may be only completing part of the SSC.[7–9] These teams may be viewed as *compliant* with the SSC; however the quality of the safety check (as defined by the number of items completed) may vary.[7,8] This argument is supported by studies

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SPECIAL ARTICLE

# A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population

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## ABSTRACT

### BACKGROUND

Surgery has become an integral part of global health care, with an estimated 234 million operations performed yearly. Surgical complications are common and often preventable. We hypothesized that a program to implement a 19-item surgical safety checklist designed to improve team communication and consistency of care would reduce complications and deaths associated with surgery.

### METHODS

Between October 2007 and September 2008, eight hospitals in eight cities (Toronto, Canada; New Delhi, India; Amman, Jordan; Auckland, New Zealand; Manila, Philippines; Ifakara, Tanzania; London, England; and Seattle, WA) representing a variety of economic circumstances and diverse populations of patients participated in the World Health Organization's Safe Surgery Saves Lives program. We prospectively collected data on clinical processes and outcomes from 3733 consecutively enrolled patients 16 years of age or older who were undergoing noncardiac surgery. We subsequently collected data on 3955 consecutively enrolled patients after the introduction of the Surgical Safety Checklist. The primary end point was the rate of complications, including death, during hospitalization within the first 30 days after the operation.

### RESULTS

The rate of death was 1.5% before the checklist was introduced and declined to 0.8% afterward (P=0.003). Inpatient complications occurred in 11.0% of patients at baseline and in 7.0% after introduction of the checklist (P<0.001).

### CONCLUSIONS

Implementation of the checklist was associated with concomitant reductions in the rates of death and complications among patients at least 16 years of age who were undergoing noncardiac surgery in a diverse group of hospitals.

From the Harvard School of Public Health (A.B.H., T.G.W., W.R.B., A.A.G.), Massachusetts General Hospital (A.B.H.), and Brigham and Women's Hospital (S.R.L., A.A.G.) — all in Boston; University of California–Davis, Sacramento (T.G.W.); Prince Hamzah Hospital, Ministry of Health, Amman, Jordan (A.-H.S.B.); University of Washington, Seattle (E.P.D.); College of Medicine, University of the Philippines, Manila (T.H.); St. Stephen's Hospital, New Delhi, India (S.J.); St. Francis Designated District Hospital, Ifakara, Tanzania (P.L.K.); National Institute of Health–University of the Philippines, Manila (M.C.M.L.); University of Auckland and Auckland City Hospital, Auckland, New Zealand (A.F.M.); Imperial College Healthcare National Health Service Trust, London (K.M.); and University Health Network, University of Toronto, Toronto (R.K.R., B.T.). Address reprint requests to Dr. Gawande at the Department of Surgery, Brigham and Women's Hospital, 75 Francis St., Boston, MA 02115, or at safesurgery@hsph.harvard.edu.

*Members of the Safe Surgery Saves Lives Study Group are listed in the Appendix.

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**Table 5. Outcomes before and after Checklist Implementation, According to Site.***

| Site No. | No. of Patients Enrolled | | Surgical-Site Infection | | Unplanned Return to the Operating Room | | Pneumonia | | Death | | Any Complication | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before | After | Before | After | Before | After | Before | After | Before | After | Before | After |
| | | | | | | | *percent* | | | | | |
| 1 | 524 | 598 | **4.0** | **2.0** | **4.6** | **1.8** | 0.8 | 1.2 | **1.0** | **0.0** | **11.6** | **7.0** |
| 2 | 357 | 351 | 2.0 | 1.7 | 0.6 | 1.1 | 3.6 | 3.7 | 1.1 | 0.3 | 7.8 | 6.3 |
| 3 | 497 | 486 | 5.8 | 4.3 | 4.6 | 2.7 | 1.6 | 1.7 | 0.8 | 1.4 | 13.5 | 9.7 |
| 4 | 520 | 545 | 3.1 | 2.6 | 2.5 | 2.2 | 0.6 | 0.9 | 1.0 | 0.6 | 7.5 | 5.5 |
| 5 | 370 | 330 | **20.5** | **3.6** | 1.4 | 1.8 | 0.3 | 0.0 | **1.4** | **0.0** | **21.4** | **5.5** |
| 6 | 496 | 476 | 4.0 | 4.0 | 3.0 | 3.2 | 2.0 | 1.9 | 3.6 | 1.7 | 10.1 | 9.7 |
| 7 | 525 | 585 | **9.5** | **5.8** | **1.3** | **0.2** | 1.0 | 1.7 | 2.1 | 1.7 | **12.4** | **8.0** |
| 8 | 444 | 584 | 4.1 | 2.4 | 0.5 | 1.2 | 0.0 | 0.0 | 1.4 | 0.3 | 6.1 | 3.6 |
| Total | 3733 | 3955 | **6.2** | **3.4** | **2.4** | **1.8** | 1.1 | 1.3 | **1.5** | **0.8** | **11.0** | **7.0** |
| P value | | | <0.001 | | 0.047 | | 0.46 | | 0.003 | | <0.001 | |

* The most common complications occurring during the first 30 days of hospitalization after the operation are listed. Bold type indicates values that were significantly different (at P<0.05) before and after checklist implementation, on the basis of P values calculated by means of the chi-square test or Fisher's exact test. P values are shown for the comparison of the total value after checklist implementation as compared with the total value before implementation.

**Table 6. Selected Process Measures before and after Checklist Implementation, According to Site.***

| Site No. | No. of Patients Enrolled | | Objective Airway Evaluation Performed (N=7688) | | Pulse Oximeter Used (N=7688) | | Two Peripheral or One Central IV Catheter Present at Incision When EBL ≥500 ml (N=953) | | Prophylactic Antibiotics Given Appropriately (N=6802) | | Oral Confirmation of Patient's Identity and Operative Site (N=7688) | | Sponge Count Completed (N=7572) | | All Six Safety Indicators Performed (N=7688) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before | After | Before | After | Before | After | Before | After | Before | After | Before | After | Before | After | Before | After |
| | | | | | | | | | *percent* | | | | | | | |
| 1 | 524 | 598 | 97.0 | 98.5 | 100.0 | 100.0 | 95.7 | 83.6 | 98.1 | 96.9 | 100.0 | 100.0 | 98.9 | 100.0 | 94.1 | 94.2 |
| 2 | 357 | 351 | 72.0 | 75.8 | 97.5 | 98.6 | 78.8 | 61.3 | 56.9 | 76.9 | 9.5 | 97.2 | 100.0 | 100.0 | 3.6 | 55.3 |
| 3 | 497 | 486 | 74.7 | 66.3 | 98.6 | 100.0 | 83.8 | 82.5 | 83.8 | 87.7 | 47.1 | 90.1 | 97.8 | 96.8 | 30.8 | 51.0 |
| 4 | 520 | 545 | 94.6 | 95.8 | 100.0 | 100.0 | 66.7 | 48.6 | 80.0 | 81.8 | 98.9 | 97.6 | 97.3 | 99.1 | 67.1 | 63.7 |
| 5 | 370 | 330 | 6.2 | 0.0 | 68.9 | 91.2 | 7.6 | 2.7 | 29.8 | 96.2 | 0.0 | 86.1 | 0.0 | 92.4 | 0.0 | 0.0 |
| 6 | 496 | 476 | 46.2 | 56.3 | 76.4 | 83.0 | 49.2 | 57.9 | 25.4 | 50.6 | 21.8 | 64.9 | 99.4 | 99.4 | 1.4 | 18.1 |
| 7 | 525 | 585 | 97.5 | 99.7 | 99.4 | 100.0 | 32.0 | 100.0 | 42.5 | 91.7 | 98.9 | 100.0 | 100.0 | 100.0 | 46.7 | 92.1 |
| 8 | 444 | 584 | 0.5 | 94.0 | 99.3 | 99.5 | 68.8 | 57.1 | 18.2 | 77.6 | 16.4 | 98.8 | 61.3 | 70.0 | 0.0 | 51.7 |
| Total | 3733 | 3955 | 64.0 | 77.2 | 93.6 | 96.8 | 58.1 | 63.2 | 56.1 | 82.6 | 54.4 | 92.3 | 84.6 | 94.6 | 34.2 | 56.7 |
| P value | | | <0.001 | | <0.001 | | 0.32 | | <0.001 | | <0.001 | | <0.001 | | <0.001 | |

* Prophylactic antibiotics were considered to be indicated for all cases in which an incision was made through an uncontaminated field and appropriately administered when given within 60 minutes before an incision was made. Sponge counts were considered to be indicated in all cases in which an incision was made. P values are shown for the comparison of the total values before and after checklist implementation, calculated by means of the chi-square test. EBL denotes estimated blood loss, and IV intravenous.

Original article

# Reducing surgical mortality in Scotland by use of the WHO Surgical Safety Checklist

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**Background:** The WHO Surgical Safety Checklist has been implemented widely since its launch in 2008. It was introduced in Scotland as part of the Scottish Patient Safety Programme (SPSP) between 2008 and 2010, and is now integral to surgical practice. Its influence on outcomes, when analysed at a population level, remains unclear.

**Methods:** This was a population cohort study. All admissions to any acute hospital in Scotland between 2000 and 2014 were included. Standardized differences were used to estimate the balance of demographics over time, after which interrupted time-series (segmented regression) analyses were performed. Data were obtained from the Information Services Division, Scotland.

**Results:** There were 12 667 926 hospital admissions, of which 6 839 736 had a surgical procedure. Amongst the surgical cohort, the inpatient mortality rate in 2000 was 0·76 (95 per cent c.i. 0·68 to 0·84) per cent, and in 2014 it was 0·46 (0·42 to 0·50) per cent. The checklist was associated with a 36·6 (95 per cent c.i. −55·2 to −17·9) per cent relative reduction in mortality ($P < 0·001$). Mortality rates before implementation were decreasing by 0·003 (95 per cent c.i. −0·017 to +0·012) per cent per year; annual decreases of 0·069 (−0·092 to −0·046) per cent were seen during, and 0·019 (−0·038 to +0·001) per cent after, implementation. No such improvement trends were seen in the non-surgical cohort over this time frame.

**Conclusion:** Since the implementation of the checklist, as part of an overall national safety strategy, there has been a reduction in perioperative mortality.

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## Introduction

Surgery continues to be an important treatment for a wide variety of conditions with an estimated 312·9 million operations performed per year across the globe[1,2]. Every surgical procedure has an associated risk of morbidity and death[3]. Multiple complex factors influence surgical outcome, with both technical and non-technical components being key factors. Consequently, surgical outcomes are influenced by multiple team members, and the systems of care in which they work[4,5]. The rates of adverse events vary across hospitals, regions and countries, with up to half due to provider or system-wide shortcomings[6–9]. As a result, various measures to improve surgical team performance and, thus, mitigate against surgical complications or adverse events have been advocated[10].

The WHO Surgical Safety Checklist is one such measure that has been implemented internationally[3]. This checklist was launched in 2008 and has since become an integral part of the surgical process across the globe[11–13]. Its aim is to make surgical procedures safer, by ensuring adherence to established practices and creating a culture of communication and teamwork that supports patient safety. The checklist is used by the entire operative team at three key points during any intervention in which harm could ensue[3,14]. The aim of its implementation in Scotland was to improve safety of surgical procedures[3], thereby improving patient





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BJA

# Surgical safety checklists: do they improve outcomes?

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## Editor's key points

- Checklists, notably the WHO Surgical Safety Checklist, have an established place in safe theatre practice.
- There is emerging evidence that checklists may have further applications in acute and emergency situations.
- Effective implementation of checklists requires individual clinicians to adapt to a changing safety culture.

**Summary.** The concept of using a checklist in surgical and anaesthetic practice was energized by publication of the WHO Surgical Safety Checklist in 2008. It was believed that by routinely checking common safety issues, and by better team communication and dynamics, perioperative morbidity and mortality could be improved. The magnitude of improvement demonstrated by the WHO pilot studies was surprising. These initial results have been confirmed by further detailed work demonstrating that surgical checklists, when properly implemented, can make a substantial difference to patient safety. However, introducing surgical checklists is not as straightforward as it seems, and requires leadership, flexibility, and teamwork in a different way to that which is currently practiced. Future work should be aimed at ensuring effective implementation of the WHO Surgical Safety Checklist, which will benefit our patients on a global scale.

**Keywords:** adverse events; communication; human factors; teamwork; WHO Surgical Safety Checklist

Complications due to healthcare are well documented and constitute an important public health problem. A number of studies have described an adverse event rate of 3–17% in hospitals in North America, Australia, New Zealand, Denmark, and the UK.[1–12] The human cost to patients, families, and their carers is considerable, as is the cost to healthcare systems. Adverse events in healthcare are estimated to result in more deaths in the USA annually than road traffic accidents, breast cancer, or acquired immune deficiency syndrome,[13] and it has been estimated that adverse events in the NHS cost £1bn and require an additional 3 million bed days annually.[11] Adverse events associated with surgery deserve particular attention—a recent systematic review suggested that the most common location of adverse events in hospital was the operating theatre. Most were associated with a surgical care provider (although few directly related to anaesthesia), and 43% of the incidents were preventable using the current standards of care.[14] If published complication rates from surgery are extrapolated to a global population (estimated 234M operations performed annually), surgery may be responsible for 7 million complications and 1 million deaths every year, twice the number of maternal deaths.[15]

The US Institute of Medicine report 'To err is human' was published more than 10 yr ago and called for efforts to reduce the epidemic of healthcare-related complications.[13] In England and Wales, the Chief Medical Officer's report 'An organisation with a memory' similarly highlighted the need to improve the safety of care in the NHS[16] and the National Patient Safety Agency (NPSA) was established as a consequence. An additional reporting arm of the NPSA was established at the same time (the National Reporting and Learning Service; NRLS), which now contains the largest database of adverse events in healthcare worldwide.

It is interesting to consider the impact of reporting incidents and how effective this is at improving the safety of healthcare. There have been more than 6 million reports to the NPSA to date, most of them minor, but the absolute numbers of those injured are high. Data from the most recent report indicate that 10 875 patients died or came to severe harm from adverse events during 2010–11, with more than 4000 events due to errors in the treatment or procedure, or implementation of care and ongoing monitoring/review.[17] The analytical capacity required to evaluate this information is enormous, but without this, there is very little to be gained from national incident reporting.

How can errors in healthcare be reduced? Training in anaesthesia and surgery has typically focused on technical skills and technological innovation. Improving safety requires an understanding of the science of error and a consideration of human factors and systems failures, recognizing the need to improve the organizational safety culture and to train to avoid and mitigate errors when they occur.[18 19] Quality improvement initiatives that focus on the implementation of simple evidence-based interventions are likely to offer opportunities to improve care for our patients. This was highlighted in the Darzi review 'High quality care for all' linking safe care with effective care; 'getting the basics right, first time, every

# Evaluation and Customization of WHO Safety Checklist for Patient Safety in Otorhinolaryngology

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**Abstract** The WHO has designed a safe surgery checklist to enhance communication and awareness of patient safety during surgery and to minimise complications. WHO recommends that the check-list be evaluated and customised by end users as a tool to promote safe surgery. The aim of present study was to evaluate the impact of WHO safety checklist on patient safety awareness in otorhinolaryngology and to customise it for the speciality. A prospective structured questionnaire based study was done in ENT operating room for duration of 1 month each for cases, before and after implementation of safe surgery checklist. The feedback from respondents (surgeons, nurses and anaesthetists) was used to arrive at a customised checklist for otolaryngology as per WHO guidelines. The checklist significantly improved team member's awareness of patient's identity (from 17 to 86%) and each other's identity and roles (from 46 to 94%) and improved team communication (from 73 to 92%) in operation theatre. There was a significant improvement in preoperative check of equipment and critical events were discussed more frequently. The checklist could be effectively customised to suit otolaryngology needs as per WHO guidelines. The modified checklist needs to be validated by otolaryngology associations. We conclude from our study that the WHO Surgical safety check-list has a favourable impact on patient safety awareness, team-work and communication of operating team and can be customised for otolaryngology setting.

**Keywords** Safe surgery · WHO checklist · Customised checklist · Otolaryngology

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## Introduction

An estimated 234 million operations are performed yearly [1]. Surgical complications are common and often preventable. Peri-operative mortality rate of 0.4–0.8% and major complications rate of 3–17% [2, 3] have been reported in inpatient surgery. These rates may be much higher in developing countries [4–6].

Most otolaryngology procedures are day-care requiring minimal access. They are susceptible to complications related to wrong procedure, wrong side and wrong patient (WSPE), as often side involved is evident only on imaging. Adverse events in any surgery usually result from simple human error which can thereby be prevented by reducing chance of such mistakes [7–11]. These errors can be reduced significantly by following a checklist which validates all steps of on-going procedure.

WHO has developed a surgical safety checklist to improve patient safety during surgery in 2009, as an add-on security tool. In an international multicentre study, the implementation of this checklist brought about significant reduction of complications and mortality. This reduction was observed, regardless of the healthcare system or economical setting [12]. This checklist has been effective in reducing complications in urgent surgery significantly.

The checklist consists of an oral confirmation by surgical teams of the completion of basic steps for ensuring safe delivery of anaesthesia, prophylaxis against infection,



Open Access

*Original Article*

# Compliance and effectiveness of WHO Surgical Safety Check list: A JPMC Audit

*Mariyah Anwer[1], Shahneela Manzoor[2], Nadeem Muneer[3], Shamim Qureshi[4]*

**ABSTRACT**

***Objective:*** To assess World Health Organization (WHO) Surgical Safety Checklist (SSC), compliance and its effectiveness in reducing complications and final outcome of patients.

***Methods:*** This was a prospective study done in Department of General Surgery (Ward 02), Jinnah Postgraduate Medical Centre (JPMC), Karachi. The study included Total 3638 patients who underwent surgical procedure in elective theatre in four years from November 2011 to October 2015 since the SSC was included as part of history sheets in ward. Files were checked to confirm the compliance with regards to filling the three stage checklist properly and complications were noted.

***Results:*** In 1st year, out of 840 surgical procedures, SSC was properly marked in 172 (20.4%) cases. In 2nd year, out of 857 surgical procedures 303 (35.3%) cases were marked which increased in 3rd year out of 935 surgical procedures 757 (80.9%) cases and in 4th year out of 932 surgical procedures 838 (89.9%) cases were marked. No significant change in site and side (left or right) complications were noted in all four years. Surgical Site Infection (SSI) was noted in 59 (7.50%), 52 (6.47%), 44 (4.70%) and 20 (2.12%) cases in 1st, 2nd, 3rd and 4th year respectively. SSI in laparoscopic cholecystectomies was 41 (20.8 %), 45 (13%), 20 (5.68%) and 4 (1.12%) in 1st, 2nd, 3rd and 4th year respectively. No significant change in chest complications were noted in all four years. Mortality rate also remained same in all four years.

***Conclusion:*** WHO SSC is an effective tool in reducing in-hospital complications thus producing a favorable outcome. Realization its efficacy would improve compliance.

**KEY WORDS:** WHO Surgical safety checklist, Safe Surgery Saves Lives initiative.

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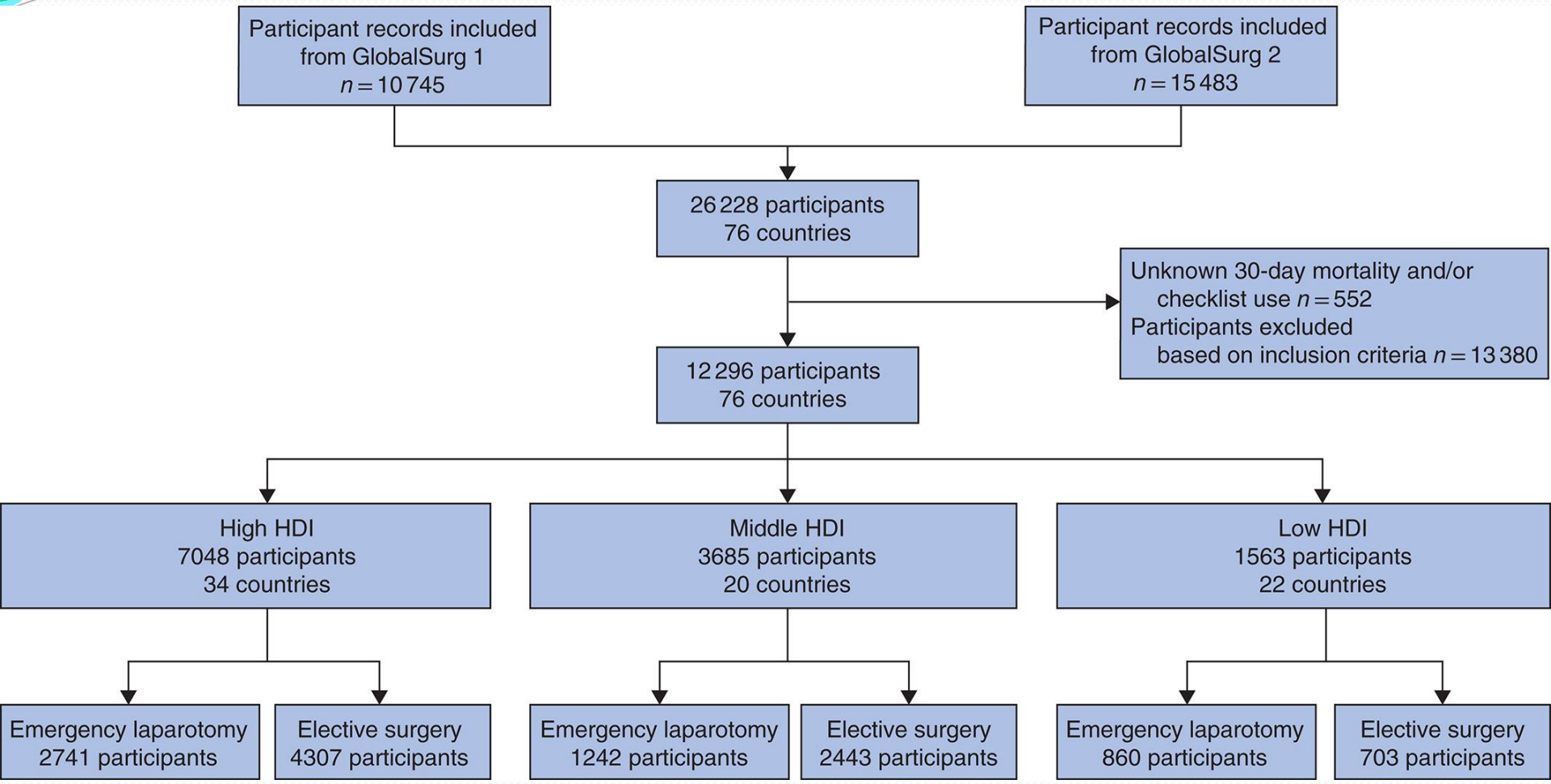
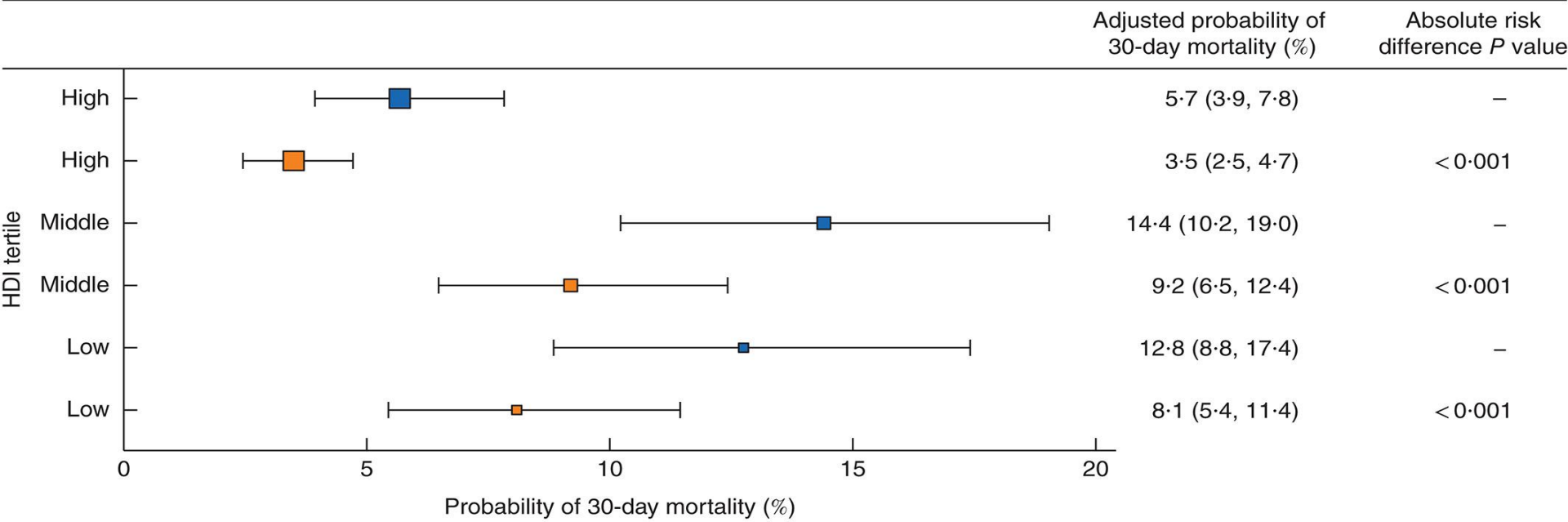
## INTRODUCTION

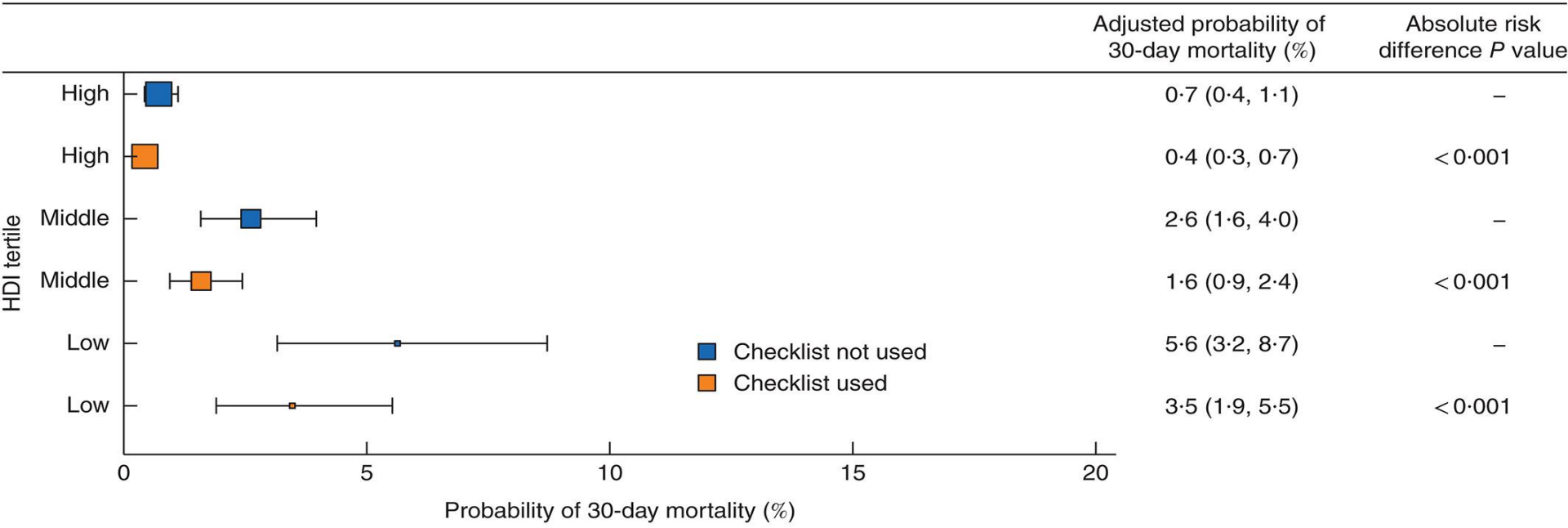
Hospitals are not as safe as generally believed.[1] Surgical morbidity and mortality are rightly considered public health concerns. It has been estimated that more than 200 hundred million major surgical procedures are performed annually worldwide.[2] Overall, the incidence of in-hospital adverse events is about 10 per cent, of which three-quarters are related to surgery. At least half of these adverse events are considered preventable within the current standards of care.[3-5] Substantial improvements can be achieved by reducing variation in the reliability of surgical care processes.[6] Briefings in the operating room improve team cooperation, motivation, discipline, and outcomes.[7]




Pooled analysis of WHO Surgical Safety Checklist use and mortality after emergency laparotomy




**a** Emergency laparotomy




**b** Elective surgery

Анализ применения контрольного списка хирургической безопасности при 3702 процедурах (1398 контрольных и 2304 интервенционные процедуры). Отмечено улучшение качественных показателей всех трёх частей контрольного списка: использование принудительного согревания воздуха увеличилось с 35,3 до 42,2%, постинцизионный прием антибиотиков снизился с 12,5 до 9,8%, предварительный прием антибиотиков увеличился с 54,5 до 63,1%. Хирургические инфекции уменьшились с 7,4% до 3,6%.

Всего контрольный список был использован при 2263 операциях, частота осложнений снизилась с 19,9 до 11,5%. Средняя продолжительность пребывания в стационаре снизилась на 0,8 дня при использовании КС, внутрибольничная летальность снизилась с 1,9 до 0,2% в 1 из 2 больниц после внедрения контрольного списка, но среднее сокращение (1,6% -1,0%) по больницам не было значительным.

| Характер оперативного вмешательства | Тип ИОХВ; %, К-1/К-2 | | | | ОШ: 95%, доверительный интервал по всем типам ИОХВ |
|---|---|---|---|---|---|
| | I | II | III | Всего | |
| Аппендэктомия | 2,04/3,8 | 0,92/3,2 | 0,2/1,5 | 3,16/8,5 | 0,352; 0,094-1,320 |
| Лапаротомия при острой кишечной непроходимости | 6,06/9,4 | 3,03/4,6 | 3,03/5,6 | 12,12/19,6 | 0,566; 0,260-1,231 |
| Грыжесечение при ущемленных грыжах | 4,1/4,6 | 2,47/4,3 | 0,82/1,3 | 7,42/10,2 | 0,704;0,261-1-893 |
| Лапаротомия при прободной язве | 4,6/6,2 | 3,07/4,3 | 3,07/5,2 | 10,77/15,7 | 0,610; 0,263-1,416 |
| Холецистэктомия из минилапаротомного доступа | 6,5/14,2 | - | 1,2/2,3 | 14,2/16,5 | 0,838;0,387-1,810 |
| Лапаротомия при остром панкреатите | 14,6/16,4 | 5,6/5,8 | 20,5/24,7 | 40,7/46,9 | 0,777; 0,444-1,360 |

Частота инфекции области хирургического вмешательства

| Вид оперативного вмешательства | Частота ИОХВ,% | | ОШ 95% ДИ, p |
|---|---|---|---|
| | К-1 | К-2 | |
| Удаление травматической субдуральной гематомы | 25,3 | 24,1 | 0,559; 0,273-1,143 |
| Удаление травматической эпидуральной гематомы | 7,4 | 11,0 | 0,647; 0,244-1,716 |
| Декомпрессивная ламинэктомия | 1,7 | 2,84 | 0,592; 0,087-4,041 |
| Удаление внутримозговой гематомы | 5,8 | 10,5 | 0,525; 0,183-1,506 |
| Клипирование аневризмы (открытым способом) | 3,8 | 5,58 | 0,668; 0,176-2,538 |
| Удаление опухоли головного мозга | 2,24 | 2,65 | 0,8413; 0,139-5,092 |
| Удаление межпозвоночного диска | 2,26 | 4,61 | 0,478-2,409 |

Частота ИОХВ при нейрохирургических операциях

| Заболевания | Летальность, % | | Отношение шансов, 95% доверительный интервал |
|---|---|---|---|
| | К-1 | К-2 | |
| Острая непроходимость кишечника | 6,05 | 12,65 | 2,425; 0,878-6,701 |
| Аппендицит | 0 | 0,03 | - |
| Прободная язва | 4,0 | 7,67 | 1,994; 0,576-6,904 |
| Гастродуоденальные кровотечения (послеоперационные) | 0 | 17,92 | $X^2$ – 18,579; p<0,001 |
| Ущемленная грыжа | 1,54 | 2,21 | 1,477; 0,182-11,993 |
| Острый холецистит | 0,72 | 1,28 | 1,788; 0,0098-32,518 |
| Острый панкреатит (панкреонекроз) | 15,38 | 27,01 | 2,048;1,016-4,127 |

Показатели летальности при острых хирургических заболеваниях органов брюшной полости

Для эффективного выполнения контрольного списка важное значение имеют командный характер работы, коммуникация и последовательность, обучение персонала и действенный механизм контроля.

Определенное значение для внедрения принципов КС имеют также сложности их использования в условиях операционных, субъективное, личностное невосприятие этих правил со стороны отдельных врачей.

Применение контрольного списка ВОЗ по профилактике хирургических осложнений позволяет эффективно снизить их число, это, прежде всего, касается так называемых предотвратимых осложнений, что доказано многочисленными исследованиями в течение последних 10 лет. Наш пятилетний клинический опыт использования также подтверждает важность в снижении многих хирургических осложнений. Анализ показал снижение частоты инфекции области хирургического вмешательства, послеоперационной летальности, респираторных, тромботических осложнений, сроков пребывания пациентов в стационаре.

Спасибо за внимание!