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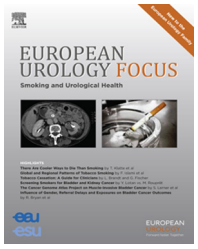

Clinical Consultation Guide

Preventing Complications: The Preflight Checklist

Arvid Steinar Haugen [a,c,*], *August Bakke* [c,d], *Terje Løvøy* [b], *Eirik Søfteland* [a,c]

[a] *Department of Anaesthesia and Intensive Care, Haukeland University Hospital, Bergen, Norway;* [b] *Gimmestad AS, Stavanger, Norway;* [c] *Department of Clinical Science, Faculty of Medicine and Dentistry University of Bergen, Bergen, Norway;* [d] *Department of Urology, Haukeland University Hospital, Bergen, Norway*

Patient safety is an overriding European Association of Urology policy [1]. This policy includes a recommendation to use the World Health Organisation (WHO) Surgical Safety Checklist (SSC). The WHO SSC has been implemented in most hospitals, but reported compliance varies significantly [2]. The checklist has three mandatory parts for all procedures: *sign in*, *time out*, and *sign out*.

1. About checklists

The aviation industry developed checklists to prevent accidents. Pilots use checklists to verify that critical items are completed before phases such as takeoff, approach, and landing [3]. The objectives are also to enhance teamwork and communication [4]. To establish effective checklist utilisation, a positive attitude towards the use of checklists must be promoted [5]. Airline experience shows that checklists must be well grounded in the operational environment to avoid being regarded as a nuisance task [4,6].

In surgery, objectives are similar: to prevent adverse events, complications, and mortality. Implementation of surgical safety checklists also faces similar challenges regarding effective utilisation [7], and building positive attitudes towards checklists and safety culture is crucial. Use of the WHO SSC and the SURgical PAtient Safety System (SURPASS) checklist has been reported to significantly prevent complications and mortality associated with urology and other surgical specialties [8–10].

An aviation checklist has the minimum items needed to operate safely. The wording is simple and concise, using customised writing rules to make them user-friendly. The philosophy is that the more user-friendly they are, the more they will be used. To keep the lists short, each item must meet defined risk criteria. The principle of incorporating risk assessment in developing a safety checklist is transferrable to surgery. The introduction of innovative technology in the operating theatre increases the complexity of surgical procedures and the hazard and patient risk of complications. Using a risk assessment tool (Healthcare Failure Mode and Effects Analysis), Ahmed and colleagues identified potential hazards in robot-assisted urology and developed a comprehensive checklist to be used in operating theatre procedures with robotic technology [11].

2. Preventing complications

The importance of actually using all three parts of the WHO SSC is reported in SSC studies with a resulting and significant "dose effect," as to decrease of morbidity and mortality [8,12–14]. In a stepped wedge cluster randomised controlled trial in two Norwegian hospitals, we identified a reduction of complications from 19.9% (440 of 2212) in control procedures to 12.4% (382 of 3083; $p < 0.001$) in intervention procedures (including procedures with fully, partially, and not used WHO SSCs). Absolute risk reduction was 7.5 (95% confidence interval [CI], 5.5–9.5) [8]. When we compared control procedures and intervention procedures with full WHO SSC compliance, complications occurred in 11.5% (260 of 2263; $p < 0.001$) of the procedures. Absolute risk reduction was 8.4 (95% CI, 6.3–10.5) [8]. Similar results were found in five UK academic and community hospitals with postoperative complications reduced from 16.9% to 11.2% ($p < 0.01$) when all three parts of the SSC were completed (odds ratio

* Corresponding author. Department of Anaesthesia and Intensive Care, Haukeland University Hospital, Bergen, Norway.
E-mail address: arvid.haugen@helse-bergen.no (A.S. Haugen).

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[OR]: 0.57; 95% CI, 0.37–0.87) [12]. Furthermore, in an Indian hospital, postoperative complications was reduced when the checklist was fully completed [13]: Wound-related complications were reduced from 8.5% to 4.5% ($p = 0.04$), abdominal complications were reduced from 28% to 19.7% ($p = 0.01$), bleeding complications were reduced from 2.8% to 0.5% ($p = 0.03$), and mortality decreased from 10% to 5.7% ($p = 0.04$). In a retrospective cohort study including 25 513 patients at a Dutch tertiary hospital, van Klei and colleagues found association between mortality and full checklist completion, with an OR of 0.44 (95% CI, 0.28–0.70) compared with 1.09 (95% CI, 0.78–1.52) and 1.16 (95% CI, 0.86–1.56) for partial and noncompliance, respectively [14].

3. Sustainability of checklist compliance

3.1. Background

After initial implementation of the SSC, sustainability of compliance is a challenge in most hospitals.

3.2. Evidence

In our stepped wedge cluster randomised controlled trial in orthopaedic, thoracic, and neurosurgery, all three parts of the WHO SSC were used in 75.0% (1767 of 2367) of procedures in 2009–2010 [15]. Five years after this initial implementation, SSC compliance is monitored across all hospitals in the Western Regional Norwegian Health Authority Trusts. In Helse Bergen Hospitals, overall SSC (all three parts) compliance was 56.7% (17 008 of 29 978) in procedures in 2015 (Fig. 1). Accordingly, compliance was 53.1% (520 of 979) in urology procedures and 50.0% (26 of 52) in robotic procedures. SSC compliance increased steadily from <50.0% in January 2015 to >72% in December 2015 following quality improvement efforts through strong manager involvement, compliance feedback to managers, and clinical staff being accountable for SSC compliance and with multidisciplinary processes to modify the checklist locally (including stakeholders).

Compliance is challenging to sustain. Across five National Health Service hospitals in England, urology had the lowest compliance for use of the time out and sign out parts of the WHO SSC compared with general and orthopaedic surgery, with the SSC used in 45.8%, 35.1%, and 19.1%, respectively, for time out and 46.9%, 35.0%, and 18.1%, respectively, for sign out [16]. Moreover, full SSC compliance (all three parts used) was reported to be 60.2% in a longitudinal study of the impact of variable WHO SSC compliance on risk-adjusted clinical outcomes after UK national implementation [12].

3.3. Recommendations

1. Ensure the use of all three parts of the SSC: sign in, time out, and sign out.
2. Record checklist compliance (all three parts) as routine in clinical and administrative registrations in the operating theatres (SSC) and wards (ie, SURPASS).
3. Establish a health trust–wide or nationwide monitoring system for checklist compliance as a quality indicator.
4. Provide feedback on checklist compliance from boards or trusts to chief executive officers (CEOs), managers, front-line staff leaders, and clinical staff.
5. Hold CEOs, managers, and leaders at all levels accountable for compliance rates.
6. Establish multidisciplinary agreement on how to perform the checklist.
7. Modify checklist content to suit local context with care: Involve all professions and stakeholders, and do not remove items that are important for patient outcome.
8. Establish a standard for making checklists concise, with writing rules to improve usability and compliance.
9. Use clinical audits to ensure utilisation of the checklist and to follow up on quality of checklist performance.
10. Record outcome as complications and adverse events for risk assessment and quality improvement.

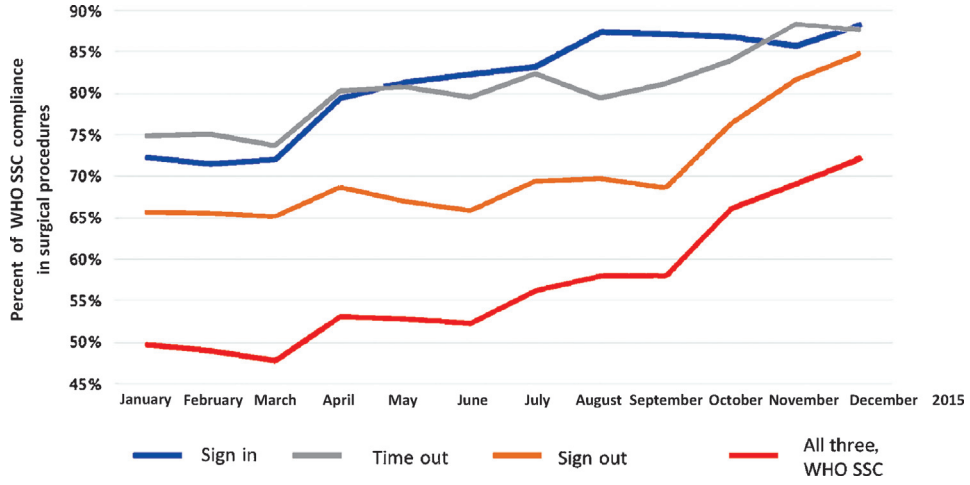

Fig. 1 – Compliance with the World Health Organization's Surgical Safety Checklist in all surgical procedures ($n = 29\,978$) from January 1 to December 12, 2015, at Haukeland University Hospital, Kysthospitalet, and Voss Hospital, Helse Bergen, Norway.
WHO SSC = World Health Organisation Surgical Safety Checklist.

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11. Use multidisciplinary and practical team training to improve quality of performance.

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Study concept and design: Haugen, Søfteland.
Acquisition of data: Haugen, Bakke, Søfteland.
Analysis and interpretation of data: Haugen, Løvøy, Søfteland.
Drafting of the manuscript: Haugen.
Critical revision of the manuscript for important intellectual content: Haugen, Bakke, Løvøy, Søfteland.
Statistical analysis: Haugen.
Obtaining funding: Haugen, Bakke, Søfteland.
Administrative, technical, or material support: None.
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