A systematic review of the effectiveness, compliance, and critical factors for implementation of safety checklists in surgery

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Purpose of this systematic review

Determine the effectiveness, compliance, and critical factors for the successful initiation and implementation of checklists or protocols in surgical theaters.
Burden of „Surgery“

• 234 Million major operations performed worldwide
• Studies from industrialized countries:
  • Permanent Disability or mortality rates: 0.4 – 0.8%
  • Complications are common: 3 – 16%

➢ Minimum of at least 1 million patients die after surgery
➢ 7 million patients are injured by surgical complications
➢ Approximately 50% of surgical adverse events can be considered preventable

Checklists or protocols

Common tool for preventing human errors in complex and high intensity areas of work

Checklists summarize 4 of the most important aspects of safety:

1. Correct identification of the patient and surgical site/side
2. Safe anesthesia and airway or respiratory function,
3. Prevention of infection
4. Successful teamwork
Questions of the review

1. What is the effectiveness of checklists or protocols in terms of complications and mortality?
2. What is the compliance with checklists (frequency and completeness)?
3. Which factors influence the compliance and effectiveness of checklists or protocols?
Methode I: Consort diagram for search strategy
## Checklists

### Surgical Safety Checklist (First Edition)

**Before Induction of Anesthesia**  
- **Sign Off:**
  - **Patient ID:**
  - **Site:**
  - **Procedure:**
  - **Anesthesia:**
  - **Site Marked:**
  - **Anesthesia Safety Check Completed:**
  - **Full Vitals:**
  - **Past Medical History:**
  - **Allergies:**
  - **Known Allergy:**
  - **No:**
  - **Yes:**
  - **Previous Anticoagulation Risk:**
  - **No:**
  - **Yes:**
  - **Risk of Thromboembolism:**
  - **Children:**
  - **Yes:**
  - **No:**
  - **Admission Intravenous Access:**
  - **Yes:**
  - **No:**

**Time Out**
- **Confirm All Team Members Have Introduced Themselves by Name and Role:**
- **Surgical, Anesthesia, Professional, and Nurse Visually Confirm:**
  - **Patient:**
  - **Site:**
  - **Procedure:**

**Preoperative Survey:**
- **Presurgical Vitals and the Critical, Unexpected, Unrelated, Associated Blood Loss:**
- **Pretreatment:**
  - **Planned:**
  - **No:**
  - **Yes:**
  - **Disease:**
  - **Children:**
  - **Yes:**
  - **No:**
  - **Admission Intravenous Access:**
  - **Yes:**
  - **No:**

**Time Out**
- **Afiative Confirmation:**
  - **Preoperative Vitals:**
  - **Yes:**
  - **No:**

**Wrist Band:**
- **Identifying:**

**Before Skin Incision**
- **Time Out:**
  - **Verify the Patient:**
  - **Verify the Procedure:**

**Before Patient Leaves Operating Room**
- **Sign Out:**
  - **Verify the Patient:**
  - **Verify the Procedure:**

This checklist is not designed to be comprehensive, rather it is designed to be used initially by local, practice-specific needs.
Methode II:

• Data relating to effectiveness, compliance and critical factors or attitudes were extracted from the studies.
• A random effects meta-analysis of effectiveness data was conducted, if two or more studies reported a specified outcome.
• Quality assessments were performed for all studies by two independent investigators using the system by Nagpal et al..
• The agreement of the quality assessments was measured with Cohen's kappa coefficient.
Results

Effectiveness
13 articles reported data on effectiveness:
- Mortality: RR = 0.57 [95% CI 0.42 - 0.76]
- Any complications: RR = 0.63 [95% CI 0.58 - 0.67]
- Surgical site infection: RR = 0.62 [95% CI 0.53 - 0.72]
- Unplanned return to the operating room: RR = 0.76 [95% CI 0.56 - 1.02]
- Pneumonia: RR = 0.87 [95% CI 0.67 - 1.13]

Compliance
15 studies evaluated the compliance with checklist or protocols:
- Overall compliance rate: 12 - 100% (mean 75%)
- Compliance rate for Time Out: 70 - 100% (mean 91%)

Factors influencing compliance and effectiveness
5 studies quantitatively or qualitatively assessed critical factors or attitudes for a successful implementation of a checklist
- For a highly effective implementation it is important that “whys” and “hows” of checklist usage are communicated
Fazit und Recommendations

- Effective tool for decreasing the burden of morbidity and mortality
- Compliance of surgical staff with using the checklist was good overall
- For implementation:
  - Acceptance of the hospital staff and the adaption to the specific context are important
  - For a highly effective implementation the following points are important: Clearly communicated “why” and “how” the checklist should be used
  - The success was much higher when checklists were introduced in a consultative way by a multidisciplinary team instead of being mandated by a single surgical staff member
- Further research: organizational and cultural factors influencing the success of the implementation of safety checklists in surgery is necessary.
- The decision which of the checklists to introduce depends on the resources and processes of the organization
Vielen Dank AND merci beaucoup AND Mille grazie [MeSH]

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