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Implementation of the World Health Organization checklist and debriefing improves accuracy of surgical wound class documentation

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Abstract

BACKGROUND: Surgical wound classification (SWC) is a component of surgical site infection risk stratification. Studies have demonstrated that SWC is often incorrectly documented. This study examines the accuracy of SWC after implementation of a multifaceted plan targeted at accurate documentation.

METHODS: A reviewer examined operative notes of 8 pediatric operations and determined SWC for each case. This SWC was compared with nurse-documented SWC. Percent agreement pre- and postintervention was compared. Analysis was performed using chi-square and a P value less than .05 was significant.

RESULTS: Preintervention concordance was 58% (112/191) and postintervention was 83% (163/199, $P = .001$). Appendectomy accuracy was 28% and increased to 80% ($P = .0005$). Fundoplication accuracy increased from 44% to 84% ($P = .016$) and gastrostomy tube from 56% to 100% ($P = .0002$). The most accurate operation preintervention was pyloromyotomy and postintervention was gastrostomy tube and inguinal hernia. The least accurate pre- and postintervention was cholecystectomy.

CONCLUSION: Implementation of a multifaceted approach improved accuracy of documented SWC.

The first iteration of surgical wound classification (SWC), first put forth by the National Research Council in 1964, stratified wounds into 4 classifications: (1) clean, (2) clean contaminated, (3) contaminated, and (4) dirty.[1] Historically, the determination and documentation of SWC has been made by the operating room nurse.[2,3] However, this documentation of surgical wound class is often inaccurate. Snyder et al[4] demonstrated that surgical wound misclassification occurred in 48% of the cases. Levy et al[5] who found misclassification in 92% of the cases corroborated this finding. This inaccuracy was further supported by a multicenter study, in which our institution participated, which demonstrated that overall concordance of SWC documentation for common pediatric surgical cases was 56%.[6]

In response to the results of this study, we evaluated our process for SWC documentation. Areas we identified for improvement were a lack of understanding of wound

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classification by the operating room nurses and a lack of surgeon participation in determining the wound classification. We then employed a multifaceted process redesign that included SWC education for nurses and physicians and inclusion of SWC into the debriefing portion of the World Health Organization (WHO) checklist. This study examines the impact these changes had on the accuracy of SWC documentation at our institution.

Methods

After Institutional Review Board approval (#202458), a single reviewer examined the operative note of 8 common pediatric surgical operations: appendectomy, inguinal hernia repair, fundoplication, gastrostomy tube placement, pyloromyotomy, incision and drainage of abscess, cholecystectomy, and stoma takedown. Both laparoscopic and open operations were evaluated where applicable. Combination cases were excluded from analysis. Using the National Surgical Quality Improvement Program algorithm, a surgical wound class was determined for each case by the reviewer. This SWC was then compared with the nurse-documented SWC.

Interventions

First, SWC-specific education began for nurses and physicians, including conspicuous bulletin boards near operating theatres and didactic lectures during weekly meetings. Second, there was nursing-led education of the circulating nurses. Third, surgeons were educated on and instructed to utilize the sign out portion of the WHO checklist. Finally, a checkpoint was added to debriefing that specifically addressed the SWC and included surgeon input. When disagreement occurred between surgeon and nurse, discussion was held until agreement was reached.

Statistical analysis

Comparison between percent agreement pre- and postintervention was done. Where appropriate, the degree of discrepancy was analyzed. Analysis was performed using chi-square and a P value less than .05 was considered significant.

Results

In the preintervention group, 191 cases were examined with an overall concordance of 58% (112/191). In the postintervention group, 199 cases were examined and in this group the overall concordance increased to 83% (163/199, $P = .001$).

The largest increase in accuracy occurred in the appendectomy group with preintervention accuracy of 28% (7/25) and postintervention accuracy of 80% (20/25, $P = .0005$). In the preintervention group, the surgical wound class for this operation was misclassified by 2 or more classifications in 44% of the cases. In the postintervention group, the largest discrepancy was one wound classification difference ($P = .0002$).

The accuracy of SWC documentation for fundoplication increased from 44% to 84% ($P = .016$). Misclassification occurred for both groups when fundoplication was performed with a gastrostomy tube. In these cases, all were misclassified as wound class I.

The accuracy of SWC documentation for gastrostomy tube placement also significantly increased after the intervention; the percent concordance increased from 56% to 100% ($P = .0002$). Similar to fundoplication, all misclassifications were documented as wound class I.

Pyloromyotomy was the most accurate operation in both the pre- and postintervention groups with 96% concordance. In each group, there was only one misclassification; the SWC in both cases was documented as clean but the gastrointestinal tract was inadvertently entered.

The increase in concordance for incision and drainage did not reach significance. However, in the preintervention group, this operation was recorded as wound class I or II in 20% of the cases. In the postintervention group, there was a trend toward significance with no cases recorded as a wound class I or II ($P = .05$).

Cholecystectomy was the least accurately documented operation in both the pre- and postintervention groups. In both groups, the official SWC differed by up to 2 classifications. In the postintervention group, all 4 wound classifications were documented; wound class I was documented 28% of the time.

Stoma takedown also did not show an improvement in concordance, with accuracy remaining less than 70%. There was heterogeneity in the classification of this operation with all 4 wound classifications documented: preintervention: class I 25%, class II 69%, class III 6%, and class IV 0%; postintervention: class I 8%, class II 56%, class III 32%, and class IV 4% (Table 1).

Comments

Studies have shown that implementation of a multifaceted plan improves compliance with surgical checklists.[7] Engaging stakeholders in policy changes ensures that changes will be appropriate for the local environment. Furthermore, it increases support and buy-in by the support staff.[8] Finally, it has been shown that educational projects that increase the culture of safety at institutions leads to improved adherence to changes in practice.[7,9] It is with this in mind that we set out to develop a plan to increase compliance with wound classification at our institution.

In 2009, the New England Journal of Medicine published the results of the World Health Organization's Safe Surgery Saves Lives program. This landmark paper demonstrated that instituting the WHO checklist decreased morbidity and mortality in surgical patients.[10] The WHO